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# electron

## user

Vol. 3 No. 9 June 1986 £1

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# FIRST BYTE

## ELECTRON JOYSTICK INTERFACE

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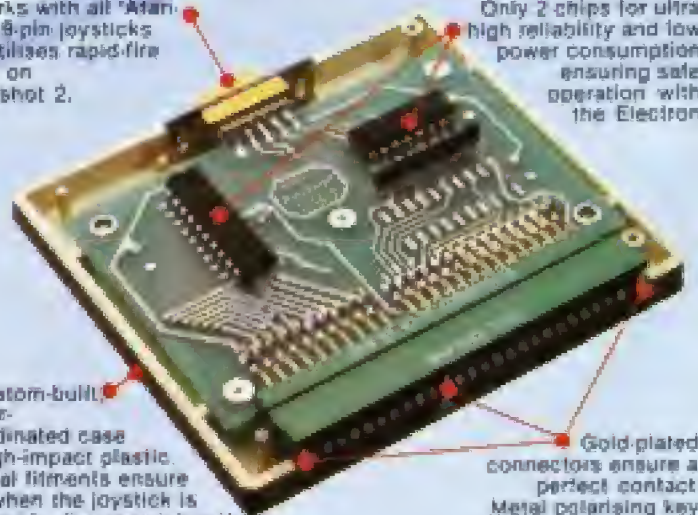
### Look at these advanced design features.

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## News

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## Tactical Pursuit

You'll need your wits about you in this two player strategy game that pits pawn against pawn. **9**

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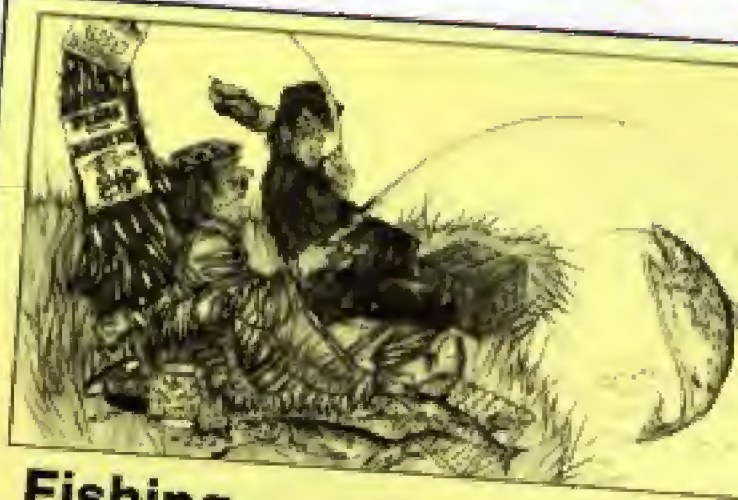
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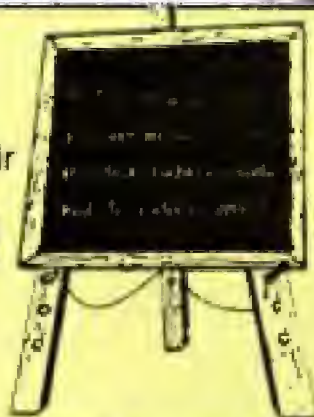
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Don't miss our special offers on Pages 56 to 60.

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# BAFFLED BY BASIC?

Get to grips with your micro with the help of the superb, easy to read series for beginners featured in *Electron User*. By the time you've read the first nine articles from Volume 1, you'll know so much more about how your Electron works.

## February 1984

Using the keyboard and getting started. An introduction to the **PRINT** command.



## March 1984

Your first program, printing text on the screen, using Basic's **LIST** and **RUN**.



## April 1984

Introducing string variables, the **LET** command and using punctuation marks.



## May 1984

An introduction to simple maths and the correct use of numeric variables.



## June 1984

More on string and numeric variables and their use with the **INPUT** command.



## July 1984

A close look at **FOR/NEXT** loops and how to use them with **PRINT**.



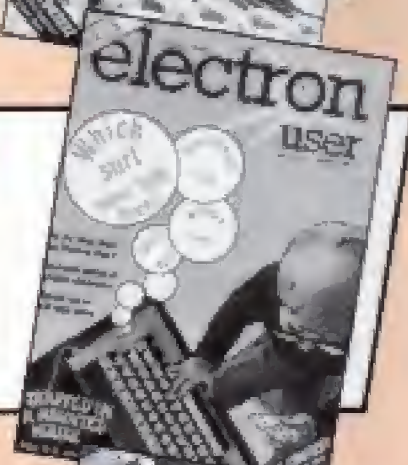
## August 1984

Delving further into **FOR/NEXT** loops we investigate the **STEP** command and its use.



## September 1984

Nesting **FOR/NEXT** loops is as easy as pie when explained as simply as this.



## October 1984

Still on loops we show how to avoid getting your variables in a twist.



Any 6 issues for £5  
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# electron user NEWS

## Hunt for a games star

HOW would you like to earn £35,000 in just a few months? That's what Tim Tyler, author of the famous Repton games for the Electron, has made in royalties so far.

Now Repton publisher Superior Software has launched a campaign to try and discover another Tim Tyler from the ranks of hobbyist programmers.

Managing director Richard Hanson told *Electron User*: "This programmer recruitment drive is unique. Only a few companies have used full-colour advertising for this purpose before, and we are offering a free guidebook telling programmers how to get the best deal for their work."

"We have aimed at producing an unbiased, informative guide — although if a programmer phones me I'll give him many good reasons why he should let Superior Software publish his games".

The guidebook, *Top Tips for Games Authors*, contains a lot of sound advice. The section on submitting programs, for example, reads: "To maximise your earnings, ask for a royalty for every copy sold. This way you will benefit if the game sells really well".

## Electron sales saved Acorn's bacon

**ELECTRON sales played a critical role in rescuing Acorn from the brink of financial collapse last year.**

The company's latest set of accounts show how close it was to total disaster 12 months ago, with losses running at more than £20 million and £18 million worth of unsold micros cluttering its warehouses.

But by the end of the year Acorn was less than £3 million in the red and stocks had been reduced to under £8 million.

Executives are now forecasting that the company will be in profit

by the end of 1986.

The healthier financial picture was made possible by the popularity of the Electron, which became the best selling home computer in the UK during the crucial run up to Christmas, knocking the Spectrum out of the number one spot.

Acorn's deal with High Street giant Dixons cleared the shelves of up

to 100,000 Electrons and gave the company a much-needed massive cash injection.

### Takeover

This, together with new management strategy following the Olivetti takeover, helped Acorn through the most perilous period in its history.

Acorn's bosses can now see daylight at the

end of the tunnel for the company, which was in deep financial distress until Electron sales took off.

"The latest figures are marginally better than we had dared hope for", a company spokesman commented.

And managing director Brian Long is even talking about the poss-

**Turn to Page 7**

## IS A NEW MODEL ON ITS WAY?

RUMOURS are circulating in the computer industry that Acorn is considering producing a new version of the Electron.

It would have enhanced features, possibly including a built-in Plus 1 to provide printer interface, joystick interface and slots for cartridge software.

Shadow RAM for more memory, and even Mode 7 colour graphics, are believed to be among the ideas being considered by Acorn's research and development team.

And an RS423 port for comms, to complement the Plus 1 cap-

ability, is also thought to be a possibility.

"It sounds as though Acorn is thinking of turning out what amounts to a kind of BBC Model B with the Electron name on it", a technical expert told *Electron User*.

"But this is not so far fetched an idea when you consider that the Electron has shaken off its former image as a mere games machine over the past 12 months."

"It is already a com-

puter for the serious user with its communications, disc drives, languages and ROM expansion boxes.

"Numerous firms have brought out add-ons in recent months that have boosted the Electron's performance to around the level of a BBC Micro, and there are several new products being launched at the Electron & BBC Micro User Show at the Royal Horticultural Hall in May".

Although Acorn

executives would not comment on the rumours, they are known to have been impressed by the Electron's continuing success as a top selling micro and the ongoing support for the machine from third party software and hardware suppliers.

They figure that if the public wants Electrons, and more than 250,000 have been sold so far, then the time may be ripe to bring out an enhanced model to fill the slot in the market created as the BBC Micro is superseded by the B Plus and the Master series.



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## New jobs drive gets Electron power...

ELECTRONS could help transform Britain's youth clubs into job "springboards".

Ed Berman, founder of Inter-Action, an educational non-profit making charity, says: "Very little organised computer activity takes place in youth clubs, yet these young people are the very ones who could make the most of the opportunity to explore computing."

"If they can get away from computer games, youth clubs could transform themselves into occupational springboards by using micros like the Electron in an imaginative way".

His theme was projected and expanded at a national conference on computer work in the youth service held aboard the Royal Princess on the Thames.

Another speaker was Mike Fordham, senior youth worker at the Honor Oak Youth Club, Lewisham.

He told how micros at his club catered for members from the age of eight to 21 years.

"They, of course, start with games and then progress into serious studies. I think within the next five years no one will be able to get a job stacking shelves unless they can use a computer to check the stocks. There is a real need for computers in youth clubs", he said.

● The Department of Education and Science has just announced a £75,000 grant, over the next three years, to Inter-Action for their youth club community computer projects.

It is subject to them raising matching funds.



Delegates at the Inter-Action conference

## New products line up for big Show

NEW products continued to pour on to the scene as the countdown began for the Electron & BBC Micro User Show at the Royal Horticultural Hall in London, May 16 to 18.

Organiser Database Exhibitions says the rate at which stands and advance tickets have been snapped up indicates the event is set to break all previous show records. Just

announced are two important new products for the Electron from Advanced Computer Products.

ADI is a powerful disc utility ROM for standard and non-standard discs, which will sell for £28.75.

Advanced ROM

Manager, a utility for ROM and sideways RAM users, is being offered at a special introductory price of £9.99.

A major attraction at the show will be a series of teach-ins featuring a team of experts on Acorn products.

## Gamesters get their prizes

RESULTS of two competitions based on games from Superior Software for the Electron have been announced.

Each successful entrant to the Repton 2 competition, which involved completing all 16 screens of the game, received a colourful T shirt.

Winner of the draw for which all correct entries qualified was Simon Irwin of Hockley, Essex, who received £200.

Competitions were also held in connection with the graphic adven-

ture Citadel. Chee Mann of London was the first person to find two of the three hidden crowns and received a prize of £100.

Darin Walden of Gateshead and Michael Lane of Hampton, Middlesex, completed the Electron version of Citadel on the same day. They each received £100 and an engraved shield.

Superior Software says Repton 3 will be released later this year and will include a screen designer, character designer, more features and more screens.

## Sales save Acorn

From Page 5

ibility of operating at a profit again this year.

"I shall be extremely surprised if we make a loss in 1986 and extremely pleased if there's a significant profit", he said.

Acorn's marketing manager, Bob Coates, was quick to pay tribute to the part the Electron had played in salvaging the company's fortunes.

"It has been a success story for the Electron since before Christmas", he told *Electron User*.

"The market for this machine considerably improved to the benefit of Acorn.

"And the vastly increased user base means that there is greater support from third party suppliers in terms of new software and add-ons".

The success of the Electron during the last half of 1985 smoothed Acorn's path through what Brian Long calls "a transitional period in which the company defined a strategy for its future and took major steps to re-establish its operations on a sound basis.

"We attacked the problem of excess stocks and purchase commitments, reducing the former from £18 million at June 30 to £7.9 million at year end", he said.

"Significant progress has also been made in streamlining corporate activities and reducing overheads".

Long says Acorn's activities are now centred on three areas - high technology research and development, exploitation of R & D along strictly defined specialist sectors, and new deals with original equipment manufacturers.

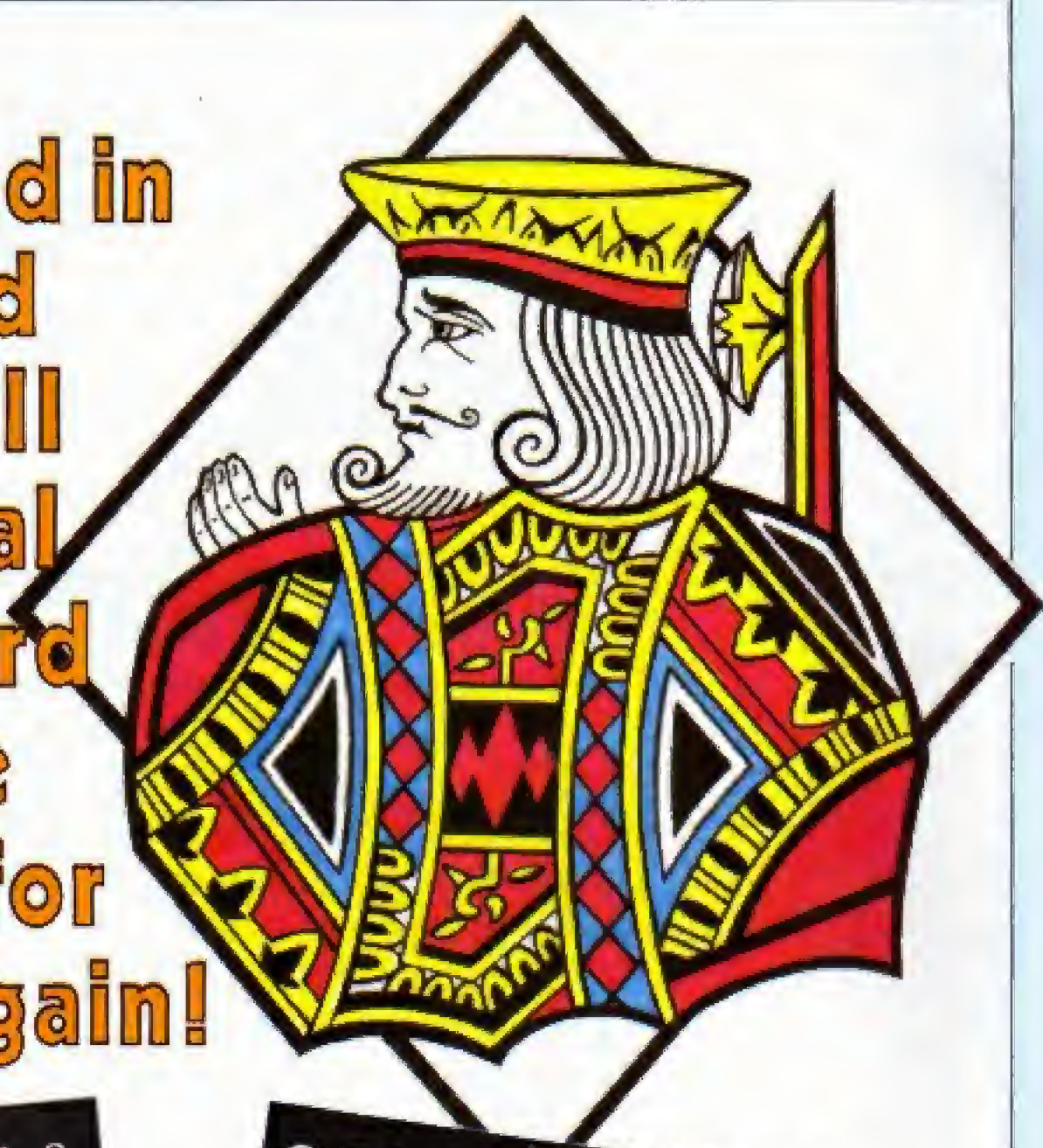


**SPACE agent Starman is back with his rescue missions in Bug Eyes II for the Electron.**

**Audiogenic Software's sequel to Bug Eyes has the daring hero in the rusting hulk of a flagship trying to retrieve 25 keys and save the entombed Zelda. Cassette price is £7.95.**



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# TACTICAL PURSUIT

By IAN WEBSTER

**TACTICAL Pursuit** is a game for two players, played using pawns on a chess board.

White goes first and the object is to get one of your pawns to the other side of the 8 x 8 board.

Enter the coordinates, vertical then horizontal, for the piece you wish to move, followed by those of the square you wish to move to.

To take one of your opponent's pieces you simply move forward or diagonally on to an occupied square. You may not take a pawn on your opponent's back row.

The number of men remaining for each player and the number of moves taken are displayed at the bottom of the screen.

I got the idea for Tactical Pursuit when our class was told to make up a board game, so some of the credit must go to my English teacher Mr Burnett.



## PROCEDURES

<b>TITLE</b>	Displays title.
<b>INSTRUCT</b>	Displays instructions.
<b>CLS</b>	Draws and deletes lines for start of game.
<b>CLS2</b>	Clears screen by drawing over it in go0,0.
<b>GAME</b>	Calls up movement and checks for winners.
<b>PLAYER1/2</b>	Gets coordinates for movement.
<b>CHECK()</b>	Checks if a man is at player's coordinates.
<b>CHECK1</b>	Checks if move is legal.
<b>CHECK2</b>	Checks if anyone has won.
<b>RESULT</b>	Displays winner.

## VARIABLES

<b>GOES</b>	Number of moves.
<b>BLACK/WHITE</b>	Number of men for each colour.
<b>whitewin%+blackwin%</b>	Flags for winners.
<b>D\$</b>	Pawn graphic.
<b>A,B,A1,B1</b>	Coordinates for movement.

Full listing starts  
on Page 10



## Tactical Pursuit listing

### From Page 9

```

10 REM Tactical Pursuit
20 REM By Ian Webster
30 REM (c) Electron User
40 ONERRORMODE:REPORT:P
PRINT" at line ";ERL:END
50 *FX16
60 MODE1:COLOUR130:CLS:V
DU23;8202;0;0;0;:VDU23,254,
255,255,255,255,255,255,255
,255:PROCTITLE
70 MODE4:VDU23;8202;0;0;
0;19,0,4;0;19,1,6;0;:PROCIN
STRUCT
80 REM initialise
90 B=1
100 GOES=0
110 DIM bX(8,8)
120 FORA=1 TO 8:bX(A,2)=1
:NEXT
130 FORA=1 TO 8:bX(A,1)=1
:NEXT
140 FORA=1 TO 8:bX(A,7)=2
:NEXT
150 FORA=1 TO 8:bX(A,8)=2
:NEXT
160 BLACK=16:WHITE=16
170 whitewinX=FALSE:black
winX=FALSE
180 VDU23,254,0,16,16,16,
16,16,16,0
190 VDU23,224,3,7,15,15,7
,3,1,1
200 VDU23,225,192,224,240
,240,224,192,128,128
210 VDU23,226,1,1,1,1,1,7
,15,0
220 VDU23,227,128,128,128
,128,128,224,240,0
230 VDU23,255,0,0,0,255,2
55,0,0,0
240 REM playing piece
250 D$=CHR$224+CHR$225+CH
R$0+CHR$8+CHR$10+CHR$226+CH
R$227
260 MODE5
270 PROC3D("TACTICAL PURS
UIT",120,1020)
280 COLOUR2:PRINTTAB(2,1)
;STRING$(16,CHR$255)
290 VDU23;8202;0;0;0;:PRO
Cdisplayboard:PROCCOLOURS
300 COLOUR1:PRINTTAB(2,1)
;STRING$(16,CHR$255)
310 REM start game
320 PROCCLS:PROCGAME
330 DEFPROCdisplayboard

```

```

340 REM display board and
men
350 COLOUR129:COLOUR0:PRI
NTTAB(0,28);"BLACK:";BLACK;
:COLOUR128:PRINT;" ";:COLOU
R3:COLOUR129:PRINTTAB(0,30)
;"WHITE:";WHITE;:COLOUR128:
PRINT;" ";:COLOUR130:PRINTT
AB(10,29)"MOVES:";GOES;:COL
OUR128
360 IF B=1 THENCOLOUR131:
VDU28,1,25,18,8:CLS:COLOUR1
28:VDU26;6=0
370 COLOUR128
380 COLOUR3:PRINTTAB(2,7)
;"1 2 3 4 5 6 7 8 "
390 COLOUR131:COLOUR0
400 PRINTTAB(2,8);STRING$
(8,CHR$254+CHR$32)
410 FORfX=1 TO 8
420 COLOUR3:COLOUR128:PRI
NTTAB(0,fX+2+8);fX;:COLOUR1
31:COLOUR0:PRINT;"-"
430 FORgX=1 TO 8
440 COLOUR129:COLOUR0
450 IF (gX+fX) MOD 2=0 TH
ENCOLOUR130
460 IF bX(fX,gX)=0 PRINTT
AB(fX+2,gX+2+7);" "TAB(fX+
2,gX+2+8);" "
470 IF bX(fX,gX)=1 PRINTT
AB(fX+2,gX+2+7);D$
480 IF bX(fX,gX)=2 COLOUR
3:PRINTTAB(fX+2,gX+2+7);D$
490 NEXT:PRINT"":NEXT
500 COLOUR128:COLOUR3
510 ENDPROC
520 DEFPROCCLS
530 REM draw and delete l
ines for
540 REM display
550 FORA=0 TO 1200 STEP40
560 GCOL3,3
570 PROCDRAW
580 GCOL3,3
590 NEXT
600 ENDPROC
610 DEFPROCDRAW
620 MOVEA,0
630 DRAWA,1824
640 MOVE1280-A,0
650 DRAW1280-A,1824
660 ENDPROC
670 DEFPROCCLS2
680 FORA=0 ^ 512 STEP4
690 SOUND1,15,600-A,1
700 GCOL0,0
710 PROCDRAW2

```

```

720 NEXT
730 ENDPROC
740 DEFPROCDRAW2
750 REM 'cls' screen by d
rawing over it
760 MOVE0,A
770 DRAW1280,A
780 MOVE0,1824-A
790 DRAW1280,1824-A
800 ENDPROC
810 DEFPROCGAME
820 REM main loop for gam
e
830 REPEAT
840 PROCPLAYER1
850 PROCHECK2
860 IF whitewinX=TRUE THE
N900
870 GOES=GOES+1
880 PROCPLAYER2
890 PROCHECK2
900 UNTILwhitewinX=TRUE O
R blackwinX=TRUE
910 PROCCLS2:PROCRESULT
920 END
930 DEFPROCPLAYER1
940 REM player one move n
ow..
950 VDU4
960 COLOUR1:PRINTTAB(0,2)
;SPC(40)TAB(0,2);"White:";:
COLOUR3
970 A=GET-40
980 IF A>0 AND A<9 THEN
PRINT;A; ELSE 970
990 B=GET-40
1000 IF B>0 AND B<9 THEN P
RINT;" ";B;"-"; ELSE 990
1010 REM is there a piece
at your
1020 REM co-ordinates?
1030 IF FNBOARD(A,B)<>2 TH
EN VDU7:80TO960
1040 A1=GET-40
1050 IF A1>0 AND A1<9 THEN
PRINT;A1; ELSE 1040
1060 B1=GET-40
1070 IF B1>0 AND B1<9 THEN
PRINT;" ";B1; ELSE 1060
1080 REM is move legal?
1090 PROCHECK(A1,B1,2):IF
no=1 THEN VDU7:80TO960
1100 PROCHECK1:IF B1=B-1
AND A1=1 bX(A,B)=0:bX(A1,B1
)=2:SOUND1,-15,150,5:PROCdi
splayboard:ENDPROC
1110 VDU7:80TO960
1120 DEFFNBOARD(X,Y)

```

```

1130 =bX(X,Y)
1140 DEFPROCHECK(X,Y,C)
1150 REM has anything been
taken?
1160 IF bX(X,Y)=C THEN no
=1:ENDPROC
1170 IF bX(X,Y)=0 THEN no
=0:ENDPROC
1180 IF C=2:IF Y=1 AND FN
BOARD(X,1)=1:no=1:ENDPROC E
LSE IF C=2:IF Y=1 AND FNBOA
RD(X,1)=0:ENDPROC
1190 IF C=1:IF Y=8 AND FNB
OARD(X,8)<>0:ENDPROC ELSE I
F C=1:IF Y=8 AND FNBOARD(X,
8)=0:ENDPROC
1200 IF C=2 BLACK=BLACK-1
1210 IF C=1 WHITE=WHITE-1
1220 no=0
1230 SOUND1,-15,170,5
1240 ENDPROC
1250 DEFPROCHECK1
1260 REM is move legal?
1270 IF A=A1+1 THEN A1=1:E
NDPROC
1280 IF A=A1-1 THEN A1=1:E
NDPROC
1290 IF A=A1 THEN A1=1:END
PROC
1300 A1=0
1310 ENDPROC
1320 DEFPROCHECK2
1330 REM has anyone won?
1340 FORA=1 TO 8
1350 IF bX(A,1)=2 THEN whi
tewinX=TRUE
1360 IF bX(A,8)=1 THEN bla
ckwinX=TRUE
1370 IF BLACK=0 whitewinX=
TRUE
1380 IF WHITE=0 blackwinX=
TRUE
1390 NEXT
1400 ENDPROC
1410 DEFPROCPLAYER2
1420 REM come on player 2
1430 COLOUR3:PRINTTAB(0,2)
;SPC(40)TAB(0,2);"Black:";:
COLOUR1
1440 A=GET-40
1450 IF A>0 AND A<9 THEN P
RINT;A; ELSE 1440
1460 B=GET-40
1470 IF B>0 AND B<9 THEN P
RINT;" ";B;"-"; ELSE 1460
1480 IF FNBOARD(A,B)<>1 TH
EN VDU7:80TO1430
1490 A1=GET-40

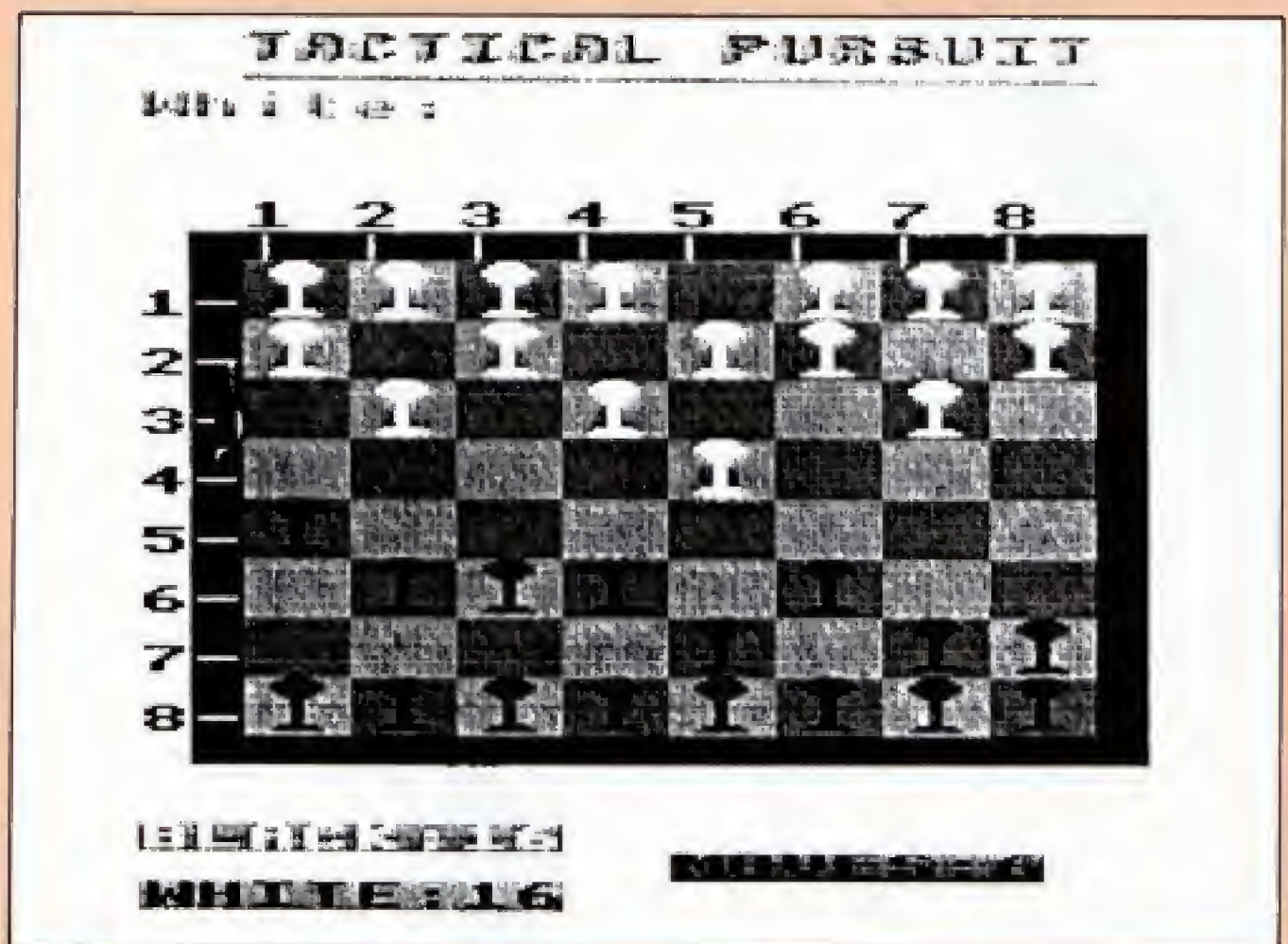
```



```

1500 IF A1>0 AND A1<9 THEN
PRINT:A1; ELSE 1490
1510 B1=GET-48
1520 IF B1>0 AND B1<9 THEN
PRINT:",";B1; ELSE 1510
1530 PROCHECK(A1,B1,1):IF
no=1 THEN VDU7:GOTO1430
1540 PROCHECK1:IF B1=B+1
AND A1=1 b1(A,B)=B:b1(A1,B1
)=1:SOUND1,-15,200,5:PROCdi
splayboard:ENDPROC
1550 VDU7:GOTO1430
1560 DEFPROCRESULT
1570 VDU19,0,4;0;
1580 PRINTTAB(2,0);STRING$
(B,D$+CHR$11)
1590 FORA=2 TO 26 STEP2:PR
INTTAB(B,A);D$;TAB(10,A);D$
:NEXT:PRINTTAB(2,20);STRING
$(B,D$+CHR$11);
1600 REM end of game who's
won?
1610 PRINTTAB(7,10)"WINS":
VDU19,1,0;0;
1620 IF whitewin=TRUE PRO
C3D("WHITE",414,800) ELSE P
ROC3D("BLACK",414,800)
1630 COLOUR3
1640 PRINTTAB(3,15);GOES;"
Moves made."
1650 COLOUR1
1660 PRINTTAB(4,26)"PRESS
SPACE"
1670 *FX15,0
1680 REPEATUNTILGET=32
1690 CLEAR:GOTO70
1700 DEFPROCINSTRUCT
1710 REM instructions
1720 PRINT SPC(12)"TACTICA
L PURSUIT"SPC(24)"*****
*****
1730 PRINT" By Ian Webs
ter for Electron User
*****
*****
1740 PRINT"A game for 2 pl
ayers. White goes first."
1750 PRINT
1760 PRINT" The idea of th
e game is to get one of yo
ur men to the other side of
the board.You move like so
:"
1770 PRINT "Always 1 squar
e forward. You may move 1 s
quare diagonally but moving
1 forward aswell.""Taking
*****

```



```

1780 PRINT"You take by mov
ing on to an occupied sq
uare, (NOT your own colour)
."
1790 PRINT
1800 PRINT"Note you may no
t take one of the back ro
w."
1810 PRINT
1820 PRINT SPC(20)"1st"SP
C(10)"_____""SPC(10)"
|"SPC(10)"|"SPC(15)"2nd:"
1830 PRINT SPC(10)"|"SPC(
10)"|"Enter coordinates
in this order"
1840 PRINT
1850 PRINT" Press SPACE
-BAR to start";
1860 REPEATUNTILGET=32:END
PROC
1870 DEFPROC3D(A$,X,Y):VDU
5
1880 GCOL0,3
1890 MOVEX,Y:PRINTA$
1900 GCOL0,1
1910 MOVEX-4,Y-4:PRINTA$
1920 VDU4
1930 ENDPROC
1940 DEFPROCTITLE
1950 REM draw title screen
using DATA
1960 VDU19,1,2;0;:*FX4,2
1970 GCOL0,0
1980 VDU5:MOVE96,892

```

```

1990 FORC=1 TO 2
2000 IF C=2 MOVE91,887:GCO
L0,1:RESTORE
2010 D=887
2020 FORA=1 TO 11
2030 READA$
2040 FORB=1 TO LEN(A$)
2050 IF MID$(A$,B,1)="*" T
HENVDU254 ELSE VDU32
2060 NEXT:D=D-32:PRINT:IF
C=2 THEN MOVE91,D ELSEPRINT
;TAB(3);
2070 NEXT
2080 NEXT:VDU4:COLOUR0:PRI
NTTAB(0,20);" By Ian Web
ster for Electron User
*****:COLOUR3
2090 VDU19,3,0;0;:PRINTTAB
(2,30)"PRESS THE SPACE BAR
FOR INSTRUCTIONS"
2100 REPEATUNTILGET=32
2110 ENDPROC
2120 DEFPROCCOLOURS:PRINTT
AB(0,3)"SPACE TO CHANGE":PR
INTTAB(0,4)"COLOUR,RETURN T
O":PRINTTAB(0,5)"SELECT COL
OUR":COLOUR1:PRINTTAB(2,2)"
CHANGE COLOURS"
2130 A=1
2140 FORAA=1 TO 2
2150 REPEAT:VDU19,AA,A;0;
2160 A$=GET$
2170 IF A$=" " A=A+1:IF A=

```

```

7 A=1
2180 UNTIL A$=CHR$13
2190 A=3:NEXT
2200 PRINTTAB(0,3);STRING$
(60," ")
2210 ENDPROC
2220 DATA"***//***//***//
***//***//***/"
2230 DATA"*/**/*/*/*/*/*/*
/*/*/*/*/*/*/*"
2240 DATA"*/**/*/*/*/*/*/*
/*/*/*/*/*/*/*"
2250 DATA"*/**/*/*/*/*/*/*
/*/*/*/*/*/*/*"
2260 DATA"*/**/*/*/*/*/*/*
***//***//***/"
2270 DATA""
2280 DATA"//***/*/*/*/*/*/*
*/*/*/*/*/*/*/*"
2290 DATA"//*/**/*/*/*/*/*
/*/*/*/*/*/*/*"
2300 DATA"//***/*/*/*/*/*/*
*/*/*/*/*/*/*/*"
2310 DATA"//*/**/*/*/*/*/*
*/*/*/*/*/*/*/*"
2320 DATA"//*/**/*/*/*/*/*
*/*/*/*/*/*/*/*"

```

This listing is included in this month's cassette tape offer. See order form on Page 61.



**Program:** Shuffle  
**Price:** £2.99  
**Supplier:** Budgie, 1 Orange Street, Sheffield S1 4DW.  
 Tel: 0742 739061

## Problem patterns

SLIDING block puzzles are still a popular pastime for children and adults alike. This offering gives a choice of 15 different pictures for you to sort out.

The basic idea is that a picture is drawn on the screen, divided up into squares, and these squares are then shuffled. Your task is to get them

back into the correct order and so re-make the picture.

There are three levels of difficulty. At the first level the picture needs only a few moves to get it back in order, whereas the third level will require many more.

The sound, which is simple but meaningful, can be turned off if required. You may mark the edge of each square with lines if you wish.

The pictures range from sequences of letters or numbers, through pictures of houses or flags to a series of patterns. All are pleasantly coloured, and a lot easier to complete with a colour

television.

One of the spiral patterns is very difficult. It makes use of flashing colours and looks like nothing on earth until it is completed.

Technically the program is very good. My main gripes are that the keyboard repeat is left on and the choice of keys is unusual.

There is, however, a First Byte joystick option within the program and it works with a Plus 1 joystick too if you use the Joyplus program in the *Electron User* for April 1985.

This is a worthwhile program, with many interesting features. At the easy level it



could appeal to 5-year-olds, but the flashing spiral takes it right through to Einstein standard.

**Rog Frost**

Sound .....	5
Graphics .....	9
Playability .....	8
Value for Money .....	8
Overall .....	8

**Program:** Commando  
**Price:** £9.95  
**Supplier:** Elite, Anchor House, Anchor Road, Aldridge, Walsall, Tel: 0922 55852

## Be your own Rambo

THIS is a game for the red blooded macho man who catches bullets in his teeth and eats three shredded wheat for breakfast.

Armed only with an M60 machine gun and six hand grenades you must make your way far behind enemy lines, annihilate the enemy troops and destroy their fortress.

Commando is a clone of the arcade hit of the same name, and it's not a bad effort. Using

joystick or keyboard you can move the soldier in any of eight directions and your bullets are always fired in the direction in which you last travelled.

Hand grenades differ from bullets in that they are always thrown up the screen irrespective of which direction you are travelling.

The action begins in a desert which is sparsely covered with trees and sand dunes. As soon as you appear you must start running forward while spraying bullets at anything which moves.

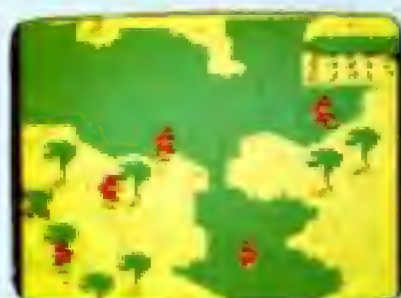
There's no chance of hitting any of your own troops as there are none - this is a suicide mission for which you drew the short straw.

Having survived the desert

you encounter your first obstacle, for your foes are guarding a road bridge under which you must travel. Not only must you beware of soldiers coming under the bridge towards you but you must also avoid the hand grenades thrown by the motorcyclist who rides to and fro across it.

Following another stretch of desert you arrive at a high wall with a large gateway. As you approach the wall the gate opens and tens of troops rush out. These must all be killed before you are allowed to pass through the gate.

The next expanse of desert is riddled with trenches from which little men pop up and shoot at you. The game seems endless as you complete



screen after screen of hectic action.

Commando provides the same kind of excitement I felt when I first played Elite many moons ago, and I shall go back to it time and time again.

**Jon Revis**

Sound .....	6
Graphics .....	8
Playability .....	8
Value for Money .....	9
Overall .....	9

**Program:** Star Maze 2  
**Price:** £1.99  
**Supplier:** Mastertronic, 8-10 Paul Street, London EC2A 4JH. Tel: 01-377 6880

## Not a maze to rave over

THE idea in Star Maze 2 is very simple - you are lost in a maze and your task is to escape. Regular watchers of BBC TV's Adventure Game will know the idea, but in this version there are no puzzles or passwords. The only problem is finding the exit.

You travel around the maze by moving forwards. When

you want to change direction you may turn through 90 degrees left or right.

You don't see yourself - just a view of passages and junctions. These are neatly drawn and give a real impression of three dimensions.

The bottom of the screen is devoted to a status display which shows how long you've been stuck in the maze, how much energy remains, your position and how far you are from the exit.

Maze sizes - your choice - can vary between a small 5 x 5 up to a large 12 x 12 matrix. Large mazes are quite difficult to solve, but if you get really stuck, the computer can draw

a map of the whole maze.

This program suffers from a number of drawbacks. The first is that it is very slow. It takes some 10 seconds for the computer to work out what you are looking at and then draw it.

Secondly, the mazes lack interest. Certainly they are random and different each time, but they tend to consist of long straight passages with very few junctions.

Finally, the game's ending is very weak. A congratulatory message just says "You've done it" while a dull five note tune repeats itself.

If you haven't got a maze game you could consider this.

**Rog Frost**



Sound .....	3
Graphics .....	7
Playability .....	6
Value for Money .....	7
Overall .....	6



*Program: Micro Maestro*  
*Price: £14.99 cassette*  
*Supplier: Mupados, Llambod*  
*Industrial Estate, Tregaron*  
*Road, Lampeter, Dyfed.*  
*Tel: 0570 422877*

## Music made easier

PRACTISING on musical instruments can be a bit of a bore. You sit alone in front of your music stand and listen to your own squeaks, scrapes, and bad notes.

The aim of Micro Maestro is to put some of the fun back into the business.

Three different packages are available and you can choose between the version for keyboard instruments, concert pitch instruments such as recorder, trombone or stringed instruments or the version for

B flat instruments. These include trumpet, clarinet and French horn.

Whichever version you opt for, you will get two cassettes plus a small booklet which tells you how to use the program. One cassette contains the software and the other has soundtracks of the music used.

The tunes are Ghostbusters, Happy Xmas (War is Over), Chariots of Fire, Superman, Dress You Up and Hello.

Loading the software will put the first tune into memory. You can then select from a number of options.

Firstly you may display the music on the screen one page full at a time. Next, the computer can play the music for you so that you can play along with it.

The musical notation is printed on the screen as you do this in a big, bold and clear

form. It has its own way of scrolling which you soon get used to.

You can adjust the tempo so that it suits your stage of learning. You can also add a visual beat counter and a bouncing ball which marks the note currently to be played.

With growing confidence you can turn the computer sound off and play the music yourself with or without the beat counter and bouncing ball.

As a final touch you can play along with the audio cassette which has two versions of each tune, one being just the backing.

Pressing Break returns you to the main menu from which you can select a different piece of music in either treble, alto or bass clef.

This is a worthwhile package. However, it is limited to the tunes supplied with it and



the poor quality of the audio recordings rather spoiled the effect.

I would suggest these packages, which run on the BBC B and Electron, are more suited to the school music department, where many pupils could use them, rather than to the individual.

**Rog Frost**

Sound .....	7
Graphics .....	7
Educational value .....	7
Value for Money .....	6
Overall .....	6

*Program: Bug Eyes 2*  
*Price: £7.95*  
*Supplier: Audiogenic, P.O. Box*  
*88, Reading, Berks. Tel:*  
*0734 303663*

## Stunner covered up

AFTER completing her mission to destroy the Xxabanean flagship agent Zelda was captured and imprisoned in the depths of a desolate asteroid.

You are agent Starman and must negotiate the asteroid's defence systems and find the 25 keys which are required to free her.

Neither the title nor the rather mediocre cassette cover do anything to entice you to buy this game, which is a pity as the game is a stunner.

Bug Eyes 2 could be summed up by the term "big is beautiful". Each of the screens in this ladders and levels game looks like it has been painted with a four inch brush.

The graphics for both the background and the sprites are big, chunky and colourful.

The simplicity of each screen does not necessarily make the game easy. It has been designed in such a way that you feel each screen is merely a tiny portion of a larger unseen screen.

Some of these sub-screens are linked directly — for

instance, falling off the edge of a cliff will take you straight into the screen below.

Other screens are accessed via the lift shafts which riddle the asteroid.

On leaving the lift you are hoisted on to a Sinclair C5 and driven to the next screen.

The reliability of this mode of transport is suspect as you occasionally have difficulty starting the vehicle.

You enter the asteroid with five lives and a life is lost each time your oxygen supply is exhausted.

You can fall from any height without suffering damage but contact with an alien will deplete your oxygen supply.

The types of aliens range from huge spotted caterpillars



to enormous dinosaurs which fly with the aid of jet packs.

Playing Bug Eyes 2 is relaxing and enjoyable, and for my money it is one of the best games of its type to date.

**Carol Barrow**

Sound .....	7
Graphics .....	9
Playability .....	9
Value for Money .....	9
Overall .....	9

*Program: Nightworld*  
*Price: £7.95*  
*Supplier: Alligata, 1 Orange*  
*Street, Sheffield S1 4DW.*  
*Tel: 0742 739061*

## Arcade adventures

NIGHTWORLD is an arcade style adventure game where you guide explorer Lee Lance around the different screens by jumping on to platforms

and avoiding the nasties flying around at random.

Exits are at first quite obvious but as the game progresses you have to find the hidden passages which take you on to further screens.

The solid triangles help you increase your score, but beware, greed is often fatal.

The format is not new but there are some unusual additions. After a set amount of time you are changed into a gargoyle.

This gives you super

powers, immunity to the nasties, and the ability to jump twice the normal height.

Instructions are brief but concise. I think a few hints or tips on where to look and what to look for would have been an advantage.

As it is I have not as yet been able to find out how to replenish my energy.

I was not addicted to this game, but if you like arcade adventures you will find it interesting and different.

**David Richards**



Sound .....	5
Graphics .....	7
Playability .....	7
Value for Money .....	6
Overall .....	6



**Program:** Mouse Trap  
**Price:** £7.95  
**Supplier:** Tynesoft, Addison Industrial Estate, Blaydon, Tyne and Wear NE21 4TE. Tel: 091-414 4611

## Challenging Mouse Trap

IT is often said that there are only three or four types of computer game – mazes, ladders and levels, invaders and adventures, and that the majority of software fits into one of these categories.

Tynesoft's Mouse Trap is nothing new and slots neatly into the second category.

Although the format is

familiar and holds no surprises, it is, nevertheless, very well written, enjoyable to play and quite addictive.

You take the part of Marvin the mouse, an athletic little rodent capable of leaping round the screen from platform to platform in his quest for cheese.

There are 22 different screens to master. On each there are several different objects to collect, some looking remarkably like Christmas puddings.

Somewhere on the screen there is a closed door, usually in the most inaccessible corner. Collect all the puddings and the door will open.

If you can make it in time you can walk through to the

next screen.

The difficulty lies in the placing of the levels and the various nasty objects which fly around the screen.

There are teapots, cups and saucers, bottles of poison, witches on broomsticks, fireballs, bombs, fried eggs and many more.

To make matters worse there's also a time limit, so if you hang about too long wondering which way to go you'll run out of time and lose a life.

You have eight lives, but they disappear all too quickly.

Mouse Trap is an excellent multi-screen levels type of game. It is difficult, so I wouldn't recommend it to beginners.



But if you're looking for something more challenging than the usual run of the mill game look no further. Mouse Trap will keep you occupied for weeks.

**Roland Waddilove**

<b>Sound</b> .....	5
<b>Graphics</b> .....	8
<b>Playability</b> .....	8
<b>Value for Money</b> .....	8
<b>Overall</b> .....	8

**Program:** Winter Olympics  
**Price:** £7.95  
**Supplier:** Tynesoft, Unit 3, Addison Industrial Estate, Blaydon NE21 4TE. Tel: 091 414 4611

## Olympics in the snow

WINTER Olympics is another of the several-games-in-one variety. Six winter sports are covered and the aim is to beat your best score in a snow-bound hexathlon.

The first event to flash up on the screen is speed skating. In this you take your competitor along a 200 metre course as

quickly as possible, while the computer operates a pace-making opponent above you.

You move your player by rapidly hammering the Z and X keys, while a clock ticks away at the base of the screen.

The second event is the ski jump which works like the first event in that the faster you hammer the keys the further you jump.

Event three is the ski slalom. You have to guide your skier down a slope, zig-zagging through the gates as quickly as possible.

Then comes downhill skiing. No gates this time, just a full pelt down the slope, trying to avoid the fir trees that are scattered about. This is

extremely tough and I still haven't completed the course.

Event five is the bobsled, and the formidable Cresta Run. The course is mapped out on the right of the screen and in a box on the left is your view from the sled.

Gravity provides the acceleration here, and the Z and X keys are used as brakes.

Lastly comes the Curling, which is probably the most disappointing event. The aim is to get your four stones as close as possible to the centre pin, while your opponent does the same.

Unfortunately there is no allowance for stones colliding. Thus it is impossible to knock a stone out of your way – you



just stop short of it.

Overall this is a nice little package and fun to play. The graphics are quite good, sound is used well and the Electron's clock has never been so useful.

**James Bibby**

<b>Sound</b> .....	6
<b>Graphics</b> .....	8
<b>Playability</b> .....	7
<b>Value for Money</b> .....	7
<b>Overall</b> .....	7

**Program:** Way of the Exploding Fist  
**Price:** £9.95  
**Supplier:** Melbourne House, 60 High Street, Hampton Wick, Kingston-upon-Thames, Surrey KT1 4DB. Tel: 01-943 3911

## Graphics with a punch

KARATE may be old news to the box office, but with all the new games coming on to the computer market one has to be the winner – The Way of the Exploding Fist.

The scenario, two men

locked in combat presided over by a Buddha and a monk, is simple, but it demands great skill and concentration to reach the goal of 10th Dan by fighting and defeating your opponents.

One or two player modes are available, each with a very different challenge to offer. In a one player game it is best to defeat the computer with the utmost speed and precision within the time of 30 seconds. For each two fights won you progress one Dan.

The point system showing how you are faring is made up of the Yin Yang symbol, awarded in full or half sections. Two full Yin Yang symbols are needed to defeat each

opponent.

In two player mode four 30 second bouts must be fought out, the winner being the player with most points.

The keys are well placed at different ends of the keyboard though there are 18 moves and 10 keys to cope with.

The variety of moves seem endless, with kicks, jabs, blocks, punches and somersaults. This game is definitely the best of the karate simulations.

The backdrop on the proceedings gives one a feeling that the programmer put as much effort into it as with the detail on the two characters.

**Giles Lane**



<b>Sound</b> .....	6
<b>Graphics</b> .....	9
<b>Playability</b> .....	9
<b>Value for Money</b> .....	9
<b>Overall</b> .....	8



# OSWORD

**JOHN WOOLLARD** shows how **Osword** graphics calls can be used in machine code programs – and help augment our Basic programming powers

WE'RE going to take a look at the Osword calls associated with screen graphics this month. Some of the programs will use machine code techniques but others will enable us to enhance the powers of Basic.

Program 1 illustrates Osword call 9 which is equivalent to the Basic function POINT used to find the

```
10 REM PROGRAM 1
20 MODE 2
30 colour% = RND(16)-1
40 GCOL 0, colour%
50 xpos% = RND(900) : ypos% = RND(900)
60 PLOT 69, xpos%, ypos%
70 osword% = &FFF1
80 block% = &900
90 !block% = xpos% + ypos% * &1000
100 X% = block% MOD 256
110 Y% = block% DIV 256
120 A% = 9
130 CALL osword%
140 PRINT "Random colour:"
150 PRINT "Osword value:"
160 PRINT "POINT value:"
170 END
```

Program 1

block%	YX	x coordinate lo byte
	YX+1	x coordinate hi byte
	YX+2	y coordinate lo byte
	YX+3	y coordinate hi byte
	YX+4	returns the logical colour of the coordinate

Table 1: Osword 9 parameter block

block%	YX	previous x coordinate lo byte
&901	YX+1	previous x coordinate hi byte
&902	YX+2	previous y coordinate lo byte
&903	YX+3	previous y coordinate hi byte
&904	YX+4	current x coordinate lo byte
&905	YX+5	current x coordinate hi byte
&906	YX+6	current y coordinate lo byte
&907	YX+7	current y coordinate hi byte

Table 2: Osword 13 parameter block

colour of a pixel at a specific coordinate.

The program selects a random colour and position for a series of dots and displays them on the screen with the results of using POINT and Osword 9 subsequently displayed in a table.

Here's how it works. The selection of the colour (line 30) and the random selection of a point upon the screen (line 50) are carried out before the Osword call is set up and made.

All Osword calls require a small section of memory called the parameter block to store data, and in this particular program I've used location &900 onward. Osword 9 requires that the coordinates of the point to be tested are placed in that block.

Line 90 uses the ! (pling) indirection operator to do that. The X and Y registers are then set to point to &900 and A is

set to 9 before the call is made in line 130.

Table 1 shows the structure of the Osword 9 parameter block.

Line 150 peeks into the fifth location of the block (XY+4) and prints the value returned. Compare this with the value returned by the Basic function POINT in line 160 and you'll see that they are the same.

Although Osword 9 has no real value to Basic programmers – POINT does the job more easily – this program illustrates the main structures of making Osword calls, which are:

- Select a location for the parameter block to reside.
- If necessary place values in the parameter block.
- Place the address of the parameter block in the X and Y registers (X takes the lo byte, Y the hi).
- Place the Osword call number in the A register.
- Make the call to &FFF1.
- If necessary read the results from the parameter block.

In Program 2 Osword call 13 reads the coordinates of the last two points the graphics cursor has visited and is used by the operating system when PLOT 85 is used to fill a triangle.

Table 2 illustrates the parameter block associated with the call and Program 2 shows how the call can be made from Basic.

Lines 20 to 80 plot two random points on a Mode 1 screen. The Osword call is then made using &900 as the start of the parameter block.

Lines 150 to 190 analyse the block and display the information against the values of the coordinates plotted. You'll see that this reveals an interesting characteristic of the graphics screen.

The disparity occurs because the screen size is 1280 by 1024 yet its true resolution is far less. For instance in all graphics modes there are only 256 pixels vertically but 1024 graphics

```
10 REM PROGRAM 2
20 MODE 1
30 DIM points%(3)
40 FOR k% = 0 TO 3
50 points%(k%) = RND(1000)
60 NEXT k%
70 PLOT 69, points%(0), points%(1)
80 PLOT 69, points%(2), points%(3)
90 osword% = &FFF1
100 block% = &900
110 X% = block% MOD 256
120 Y% = block% DIV 256
130 A% = 13
140 CALL osword%
150 PRINT "Coordinates of points"
160 PRINT "Sent      Received"
170 FOR k% = 0 TO 3
180 PRINT points%(k%), ?(block%+k%*2) + ?(block%+k%*2+1)*256
190 NEXT k%
200 END
```

Program 2



## From Page 15

coordinates. This means that each pixel is addressed by 1024/256 or four Y coordinates.

Program III utilises the techniques developed in Programs I and II to read the logical colour of a particular pixel on the screen. The whole process is carried out in machine code.

Lines 60 to 90 set up and call Osword 13 to reveal the last two coordinates visited by the graphics cursor. The parameter block is placed in the area immediately after the program.

The second Osword call made on line 130 returns the logical colour of the pixel. The parameter block is located over part of the first block. Table III shows how the data

returned by the first call is used to determine the action of the second call.

Finally lines 140 and 150 tease out the important value and place it in location &70.

The section of Program III from line 200 onward plots 10 points of randomly selected colours. After each point is plotted a call to the machine code program is made and the value of the colour is printed in a table. This routine can be used in machine code games for collision detection.

You could use the Osword technique developed in Program II to add an extra facility to the graphic powers of your computer. You'll be aware of the triangle plotting options PLOT 80 to PLOT 87. The procedure in Program IV uses Osword call 13 to draw rectangles in a similar manner.

Calling PROCrectangle will fill a rectangular shape with colour. The size of the rectangle is determined by the last two points visited by the graphics cursor, and the colour is the current graphics colour.

Program IV selects two random points on a Mode 0 screen and then constructs the rectangle. This is how the procedure works.

Line 80 sets the plot number to 85 - triangle absolute plotting in the current graphics foreground colour. Changing the plot number to 21 with:

**180 plotI = 21**

produces an outline of the rectangle but doesn't fill it.

The parameter block for the Osword call is located from &900 onward. The call is set up and made between lines 90 and 140.

Lines 150 to 180 tease out the data from the parameter block and place it in the variables *px%*, *py%*, *cx%* and *cy%* - that's the last X, last Y.

current X and current Y coordinates respectively. Lines 190 to 220 plot the rectangle.

We'll now turn to another use of an Osword call that gives us more programming power. Osword 11 is associated with the colour palette.

There are 16 logical colours on the Electron and in Mode 2 all are available on the screen simultaneously. However the other modes have a restriction on the number of colours that may be used at any one time.

So that you can have a choice of colours on the screen each logical colour can be assigned a specific physical colour. Colour 1 can be red, yellow, blue or whatever you want. That's called writing to the palette and is carried out using the VDU 19 statement.

Osword gives us the power to read the physical colour attributed to a particular logical colour. This isn't possible using VDU or any other Basic instruction.

Program V reveals the physical colours assigned to

```

10 REM PROGRAM III
20 DIM programI &30
30 FOR optI = 0 TO 3 STE
P 3
40 PI = programI
50 I OPT optI
60 LDX# blockI MOD 256
70 LDY# blockI DIV 256
80 LDA# 13
90 JSR &FFF1
100 LDX# (blockI+4)MOD256
110 LDY# (blockI+4)DIV256
120 LDA# 9
130 JSR &FFF1
140 LDA blockI+0
150 STA &70
160 RTS
170 .blockI
180 1
190 NEXT
200 MODE 2
210 FOR pointI = 1 TO 10
220 BCOL 0, RND(16)-1
230 PLOT 69,RND(1000),RND
(1000)
240 CALL programI
250 PRINT pointI,&70
260 NEXT
270 END
    
```

Program III

```

10 REM PROGRAM IV
20 MODE 0
30 MOVE RND(900)+100, RN
D(800)+200
40 MOVE RND(900)+100, RN
D(800)+200
50 PROCrectangle
60 END
70 DEFPROCrectangle
80 plotI = 85
90 oswordI = &FFF1
100 blockI = &900
110 XI = blockI MOD 256
120 YI = blockI DIV 256
130 AI = 13
140 CALL oswordI
150 pxI = ?(blockI + ?(blo
ckI+1)+256
160 pyI = ?(blockI+2) + ?
(blockI+3)+256
170 cxI = ?(blockI+4) + ?
(blockI+5)+256
180 cyI = ?(blockI+6) + ?
(blockI+7)+256
190 PLOT plotI, cxI, pyI
200 PLOT plotI, pxI, pyI
210 PLOT plotI, pxI, cyI
220 PLOT plotI, cxI, cyI
230 ENDPROC
    
```

Program IV

block%	YX	previous
block%+1	YX+1	x,y
block%+2	YX+2	coordinate
block%+3	YX+3	
block%+4	YX+4	current YX
block%+5	YX+5	x,y YX+1
block%+6	YX+6	coordinate YX+2
block%+7	YX+7	YX+3
block%+8		YX+4

YX for the second Osword call with A=9 is set to the YX+4 value of the first call.

Table III: Oswords 9 and 13 parameter blocks

```

10 REM PROGRAM V
20 FOR modeI = 0 TO 6
30 MODE modeI
40 PRINT "Logical Physic
al Colour Table for Mode ";
modeI
50 FOR logcolI = 0 TO 15
60 physcolI = FNpalette(l
ogcolI)
70 PRINT logcolI, physcol
I
80 NEXT
90 gI=GET
100 NEXT
110 END
120 DEFNpalette(logicalI
)
130 oswordI = &FFF1
140 blockI = &70
150 XI = blockI MOD 256
160 YI = blockI DIV 256
170 AI = 11
180 ?blockI = logicalI
190 CALL oswordI
200 = ?(blockI+1)
    
```

Program V



block%	YX	logical colour
	YX+1	physical colour
	YX+2	0
	YX+3	0
	YX+4	0

Table IV: Oslowd 11 to read the palette

the 16 logical colours in each of the seven modes. The function FNpalette requires the logical colour and uses an Oslowd call to return the value of the physical colour.

The parameter block of Oslowd call 11 has only two essential elements – the first is set before the call is made and the second is the corresponding physical colour. The rest of the block contains zeros to pad it out as shown in Table IV.

The final program this month enables machine code programmers to change the physical colour of the palette.

Program VI contains an assembly routine that uses the values placed in &70 and &71 to carry out the equivalent of a VDU 19 command.

Lines 70 and 90 check that the values located in &70 and &71 are less than 16, and if they are not the routine aborts. The padding zeros are then added (lines 100 to 130) and lines 140 to 170 set up and make the call.

This example of its use sets &70 to 1 and &71 to 3. That's equivalent to VDU 19, 1, 3, 0, 0, 0 and turns the screen text yellow in Mode 6. To change

```

10 REM PROGRAM VI
20 DIM palette% 420
30 FOR opt% = 0 TO 3 STE
P 3
40 PI = palette%
50 [ OPT opt%
60 LDA &70
70 CMP# 16 : BPL rts%
80 LDA &71
90 CMP# 16 : BPL rts%
100 LDA# 0
110 STA &72
120 STA &73
130 STA &74
140 LDA# 12
150 LDA# &70
160 LDY# 0
170 JSR &FFF1
180 .rts% RTS
190 ]
200 NEXT
210 ?&70 = 1
220 ?&71 = 3
230 CALL palette%
240 REM equivalent to VDU
19,1,3,0,0,0

```

Program VI

the background colour to blue set &70 to 0 and &71 to 4.

● Next month we'll look at the use of the final five Oslowds. I'll show how to set up a clock that runs con-

tinually, even when the computer is doing other things.

We will also develop an input routine that you can use in your assembly language programs.

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QUALIFIERS

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TAPE 2  
FINALS

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## MICROLINK TRANSFERS SPACE PROBE DATA

MICROLINK has been chosen to provide vital transatlantic communications for a project that will eventually push back the frontiers of space even further.

An organisation called Astra - Association in Scotland To Research Into Astronautics - is experimenting with the design of a spacecraft that could travel millions of miles hopping from planet to planet and still survive a close encounter with the sun.

It is based on a concept known as Waverider, originated 20 years ago at

Glasgow University by Professor Terence Nonweiler, where the vehicle flies at hypersonic speeds on the shock waves produced by its leading edges.

The project has attracted the attention of the Jet Propulsion Laboratory of the University of California which is working with NASA on Starprobe, a mission to fly within two miles of the sun.

The Americans see Waverider as the most serious contender for the role of Starprobe transporter because it can travel far into space by leaping from one planet to another, harnessing

the gravitational force of each in the manner of a slingshot.

A leading member of the Starprobe team, James Randolph, has been to Scotland to see the work in progress. "Waverider is an ideal solution, perhaps the only one, to the problem of finding a vehicle with a high lift-to-drag ratio", he said after his inspection.

MicroLink's role in the project is to act as a fast and efficient medium for transmitting information from Astra in Scotland to the Jet Propulsion Laboratory in California.

## Airlines guide goes on-line

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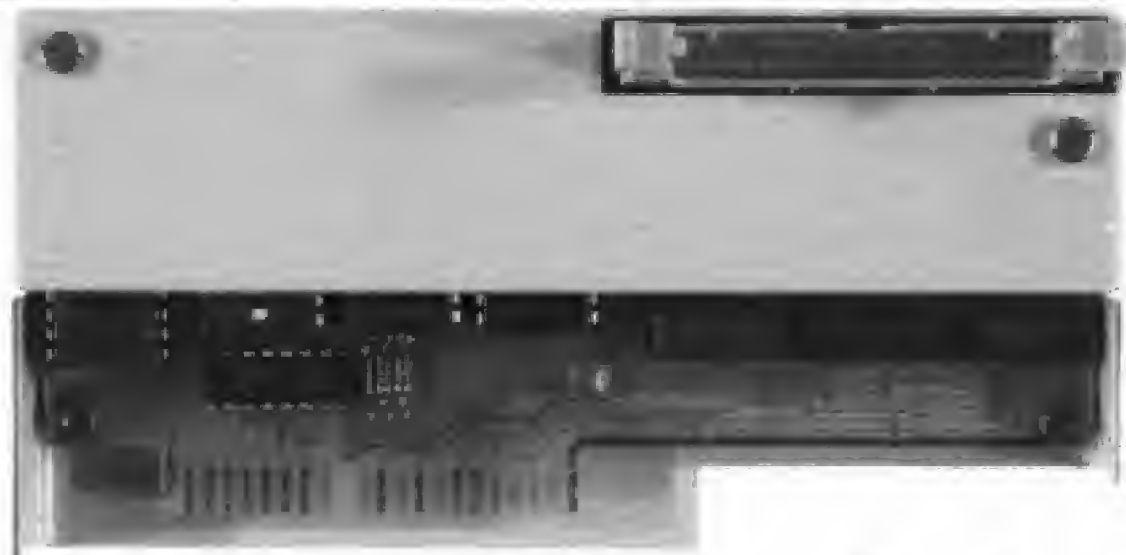
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**Product:** Plus Four Disc Interface  
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**Supplier:** Advanced Computer Products, 6 Ava House, High Street, Chobham, Surrey GU24 8LZ. Tel: 0276 76545



**PLUS 4**, from Advanced Computer Products, is yet another disc system for the Electron. There are already three, the Plus 3 from Acorn, Cumana's interface and Solidisk's, so why bring out another?

Well, each has its own advantages and disadvantages. Each works in a different way and one are compatible with each other.

This means, for instance, that if you have one disc system you can't swap discs with a friend who has a different system — without a lot of hassle, that is.

ACP's offering is an Acorn cream coloured interface that plugs into one of the Plus 1's ROM cartridge sockets.

It's the same height and depth as an ordinary cartridge but about twice the width, making it quite a neat unit since most of it disappears into the cartridge slot.

This is more important than you might think because unfortunately once you start to expand your Electron you'll find it can take up quite a large amount of desk space.

Believe me, that old joke about the Electron becoming so big that it's falling off the back of the table is true.

At the rear of the Plus 4 is a standard socket to take a disc drive, identical to the one on a BBC Micro.

You can use 40 or 80 track 3½ or 5¼in drives, double or single sided, provided they have their own power supply, so there is plenty of choice.

On opening up the Plus 4 you'll find four sockets, three are filled and one empty.

A WD 1770 disc controller

is fitted in the first. It's quite popular since it is relatively cheap and can be used in single or double density mode, which crams more on a disc.

This is the same as used in the Plus 3, BBC B+ and the new Master series.

Next comes a standard ROM socket. ACP will tell you it's for ADT, their Advanced Disc Toolkit ROM, but it can be used with any available Electron ROMs.

The third socket is fitted with ACP's 1770 DFS. This is virtually identical to the DFS used in the BBC B+ and Master and is designed to be as compatible as possible with the old Intel 8271 disc controller and DFS used in the ordinary BBC Micro.

This means that the disc controller is restricted to single density mode and the DFS restricts the number of files on a disc to 31. Directory names are single character only and filenames are up to seven characters.

The advantage of this compatibility is that it is possible to save a program to disc on your Electron, put the

disc into a drive connected to a BBC Micro and load it straight in, and vice versa.

The discs used are identical so there's no problems with swapping unprotected software.

You'll find a full review of ACP's 1770 DFS in the February 1986 issue of *Electron User*.

The last socket in the Plus 4 is fitted with a 6264 8k static RAM chip. This is used exclusively by the DFS and isn't an addition to the ordinary RAM available to Basic.

Although it doesn't provide you with any extra memory the important advantage of this system is that you don't lose any.

All disc filing systems require some workspace in which to operate. For instance, the ADFS in the Plus 3 requires about 4k which is grabbed from the free memory available to Basic.

This can pose a problem when running programs in Modes 0, 1 and 2 as it is all too easy to run out of memory.

With ACP's Plus 4 fitted

PAGE stays fixed at &E00 so you've got exactly the same free memory as before. Those long programs that ran from tape will run from disc without any modification and without the need for downloaders.

An added bonus is that if you can beg, steal or borrow the ADFS ROM out of a Plus 3 then you've got both ADFS and DFS, enabling you to access both Electron Plus 3 discs and BBC discs.

PAGE is set to &1D00 by the ADFS, but you can reset it to &E00 and use the DFS instead.

The Plus 4 has been in use in the office for some time and has performed perfectly. I can't fault it.

**VERDICT:** Weighing up the advantages and disadvantages of all four disc systems currently available for the Electron, I think ACP's Plus 4 comes out on top. I can recommend it to anyone contemplating upgrading to disc.

# Disc drive compatibility at long last

**ROLAND WADDILOVE**  
 reviews the Plus 4 from ACP





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BY now you are probably used to writing your own programs or, at least, trying to figure out how other people's programs work. Or, if you're like me, trying to understand how my own programs work.

And, as you might expect from anything to do with computers, you'll find that they consist of a lot of calculations. Even arcade games which seem to have no sums in sight, have maths lurking in the background.

Often the same calculation is done over and over, only the actual figures involved changing. Program I gives a wonderfully trivial calculation.

```
10 REM Program I
20 PRINT "Give me a number"
30 INPUT number
40 double=2*number
50 PRINT double
```

Program I

All it does is to take a number from the keyboard and double it, displaying the result. However, simple though it be, it is an example of a calculation.

Program II shows another way of doing the same thing, except now it uses a user-defined function, the subject for this month.

```
10 REM Program II
20 PRINT "Give me a number"
30 INPUT number
40 PRINT FNdoub
50 END
60 DEF FNdoub
70 =2*number
```

Program II

The first few lines are easy enough. They ask for and accept a number. However, now there's an FNdoub lurking in the listing. And FNdoub is a function.

We've already dealt with numeric functions, using the ones ready made for us in the Electron's BBC Basic such as INT, COS, and DEG. What they have in common is that when they're used they all give a number as a result.

Now those awfully clever

people at Acorn put as many standard functions into BBC Basic as they could. Not only that, they allowed programmers to make up their own functions, and this is where the DEF and FN of Program II come into play.

The Electron works its way down the listing and comes to line 40. Here it's told to PRINT FNdoub. From the name — the FN is a dead giveaway — it knows that it is to use a function which will give it a number to display, as is a function's wont.

The letters immediately after the FN name the function. However, unlike the functions we've used so far, the micro doesn't have FNdoub in its Basic.

This doesn't defeat our Electron, which realises, because of the FN, that it is a user-defined function that it has to deal with.

So it starts looking through the rest of the listing for the lines that define the function. And it finds FNdoub defined by lines 60 and 70.

The DEF of line 60 tells the micro that what follows is a function definition. The FNdoub names the function. And the next line actually shows how the result of that function is worked out.

It's a weird looking line, with the equals sign, =, as its first character. This forlorn-looking sign is one of the characteristics of a user-defined function. It tells the

micro what the function DEFINED in the previous lines is to be made equal to.

It marks out the place that the Electron looks to for the value that the function will return. In this case it's easy to see that the function will take a value that is twice whatever number is.

This may not seem all that much of an improvement on Program I, and in fact it isn't, but once you've defined a function it can be called from all over the program.

Hence in a longer program we could call FNdoub from all over the place with different values of number. We wouldn't have to show the micro how to do the calculation each time.

Notice that I've placed the function definition right at the end of the program. In fact I've put it after the END of line 50.

The function definition could, in fact, go anywhere, but it's good practice to put it at the end of the program out of harm's way. Also it's easier to find!

The END is necessary to stop the main program running into the function definition and trying to execute those lines. Try omitting line 50 and you'll see the result. The micro gets very confused. As it is, the END stops this.

It may seem strange to have some lines after the END. How does the program get to them if it's stopped at line 50?

The answer is that when

line 40 calls the function, these lines are obeyed and then the program carries on from the line following the one that called the function. In this case it's the END, which stops everything.

You can look on the function definition as the appendix to a book. Whenever the program comes across a reference to a user-defined function it looks to the function definitions at the end of the listing to see what it has to do.

Before we leave Program II for good, after all that talk about the equals sign of line 70 showing the value that is given to the function, I have to admit that a simple:

```
60 DEF FNdoub=2*number
```

would do the job just as well. And it's easier to follow. However, functions aren't always as simple as this, as a quick look at Program III will convince you.

This uses a function to

```
10 REM Program III
20 PRINT "Tell me height
, base"
30 INPUT height,base
40 PRINT FNArea
50 END
60 DEF FNArea
70 area=height*base
80 =area
```

Program III



calculate the area of a rectangle. Lines 10 to 30 collect its details, storing them in the variables *base* and *height*. And line 40 calls the function *FNarea* and displays the result.

Now let's have a look at the lines that define the function, lines 60 to 70.

Line 60 is straightforward enough. The DEF signifies that the lines that follow define a function while the *FNarea* names it.

Likewise, line 80 should hold no problems. The fact that it begins with an equals sign shows that when it is called the function *FNarea* is to be given the value held in the variable *area*.

But what of the line in the middle, line 70? This calculates the value of *area*. *height* and *base* are multiplied together and the product stored in *area*. In effect, line 70 is a scratchpad where the Electron does its calculations.

In this example the calculation is quite simple, and the last lines could be replaced by:

```
60 DEF FNarea
70 =height*base
```

or even:

```
60 DEF FNarea=height*base
```

However the point to grasp is that lines between the DEF and the final line – the one beginning with an equals sign – can be used to do the calculations involved in working out the function's result.

The last line takes whatever is to the right of the equals sign and assigns that value to the function.

In this case there was only one, trivial, line sandwiched between the boundaries of the function. However it's not hard to imagine cases where more complicated calculations are done in the scratchpad area.

Suppose there was a call for a function *FNtax* which calculated the tax payable on a certain income.

The lines between the DEF and the final equals sign would be full of calculations and IF statements as various

allowances and tax thresholds were allowed for.

And at the end of it all, the bottom line, that strange looking line beginning with the equals sign takes the result of all this and gives the value to the function.

Looking back to our use of Basic's standard functions, you'll remember that we could use parameters with them. These were the numbers, or numeric variables, in the brackets following the function name.

They gave the function the values it was to work on to produce its result. You might ask if we can do the same thing with our user-defined functions and the answer is that we can, as Program IV shows.

```
10 REM Program IV
20 PRINT "Tell me height
, base"
30 INPUT height,base
40 PRINT FNarea(height,b
ase)
50 END
60 DEF FNarea(height,bas
e)
70 area=height*base
80 =area
```

Program IV

The first three lines echo Program III. But now the function called is *FNarea* (*height*,*base*). The numeric variables *height* and *base* are the parameters of the function.

The Electron is told to expect these parameters by the function definition of line 60. Here the function name is followed by the parameters that have to be used.

Now the micro knows that if the function is called by, say:

```
FNarea(3,4)
```

the value 3 is to be given to the variable *height* and 4 to the variable *base*. These are then used in the subsequent calculations and the result given back to the function by line 80.

Notice that the values inside the brackets when the function is called are matched one-to-one with the variable

names in the brackets following the function definition.

Now there are two parts to getting a function to work. One is the function definition which shows the micro what to do.

However this doesn't do anything in itself. It has to be called by the main program and, if necessary, supply values to take the place of the variables in the function definition. This is the second part.

Then the micro gets cracking with its calculation. Bearing this in mind, have a look at Program V which might, at

```
10 REM Program V
20 PRINT "Tell me height
, base"
30 INPUT width,length
40 PRINT FNarea(width,le
ngth)
50 END
60 DEF FNarea(height,bas
e)
70 area=height*base
80 =area
```

Program V

first sight, appear a little confusing.

It may seem that there are two functions involved. Line 40 has *FNarea*(*width*,*length*) while the function definition of line 60 has *FNarea*(*height*,*base*). However it's simpler than it seems. I doubt if you'd have any problems if line 40 was:

```
40 PRINT FNarea(7,10)
```

From this it's obvious that when the program goes to the function definition to find out what to do, 7 will be given to the variable *height*, 10 to *base*. And the following calculations will use those values. It's the same with the:

```
40 PRINT FNarea(width,
length)
```

What the program does is to take the values that line 30 has given to *width* and *length* and make these the parameters of the function. So if *width* were 15 and *length* 20, then line 40 effectively

becomes:

```
40 PRINT FNarea(15,20)
```

Now when the program looks to the function definition, *height* takes the value 15, *base* 20.

As the values are taken from one set of variables, made parameters for a function call, whose values are then given to variables used to work out the value of the function, it's reminiscent of passing the parcel.

In fact this operation is known as passing parameters, and we'll be looking at it in more detail when we come to procedures. For the moment, however, let's look at Program VI, a last example of functions at work.

It's quite simple, just being used to calculate the VAT and hence the total price of an item. And there's not a parameter in sight!

Notice how the procedure definition has two lines of calculations, 70 and 80. The first works out the VAT

```
10 REM Program VI
20 PRINT "What is price
excluding VAT?"
30 INPUT price
40 PRINT "The all-in pri
ce is ";FNallin
50 END
60 DEF FNallin
70 vat=price*0.15
80 total=price+vat
90 =total
```

Program VI

payable, the second adds this to the basic cost of the item, storing the result in the variable *total*. The final line sets the value of the function *FNallin* to the value of *total*.

And that's where we leave user-defined functions. Try making up some of your own for, say, calculating compound interest over a number of years or your age in days or weeks. Remember, if you find that you're writing a program that does the same calculation repeatedly with different figures, then a function may be a better way of handling things.

● Next month we'll be looking at how subroutines function.



**SIMPLE** screen dumps were featured in the March 1985 issue of *Electron User*. Another program was published in *Micro Messages* in May 1985.

With these and a dot matrix printer you can make permanent pictorial records of a monochrome screen display. Line drawings and text come out especially well.

But what if the screen picture is in colour? Like early customers of Henry Ford, can we choose any colour – as long as it's black?

We are used to thinking of the Electron screen as a two dimensional array of pixels 640 columns x 256 rows in Mode 0, 320 x 256 in Modes 1 and 4, and 160 x 256 in Modes 2 and 5.

When a dot matrix printer is operating in bit image mode under the control of a screen dump program, the paper may be thought of in the same way.

It's as if a defined rectangular area of the paper were covered with minute rectangles like a sheet of graph paper. Each printer pixel can be made black (if the pin in the printer head covering it is instructed to fire) or left blank (white).

In the simple dump I wrote primarily for Modes 1 and 4 (in the May 1985 issue) the

relation between paper and screen was of the simplest – one dot position on the paper equalled one Mode 1/4 pixel on the VDU.

Because in normal density bit image printing with the Shinwa/CTI CP-80 printer the horizontal spacing between dots is the same as the vertical spacing – which is fixed by the dimensions of the print head – this one-to-one correspondence gave accurate printouts (for instance circles came out as circles, not ellipses) with a picture size of 3.75 x 3 inches.

Not much joy here, you may say, since a pixel can be printed only as black or white. Actually, with a dump written in Basic this isn't entirely so.

You can use the RND

function to get a pixel in a certain colour printed in black half the time on average, or a quarter of the time, so giving a darker or lighter grey appearance to areas of the paper.

But this is difficult in faster machine code programs, and we have to rely on distribution in space, rather than in time.

So let's double the size of the printed picture area to 7.5 x 6 inches, still a convenient size for A4 paper.

Now we again have 320 x 256 pixels on the Mode 1 screen – but 640 x 512 printer pixels available on paper.

Each screen pixel is represented on paper by four dots (::). We can arrange that for different colours of a screen pixel the printer responds by printing:

- 0 dots – white
- 4 dots – black
- 3 dots – dark grey
- 2 dots – medium grey
- 1 dot – light grey

With two dots we can choose a horizontal or vertical striped effect, or medium grey pepper-and-salt. In this way differently coloured areas of the screen are represented on paper by black-and-white areas which differ in shade and/or texture.

You can see that the choices are adequate to cope with the four colours available in Mode 1.

Of course the real test is Mode 2 with its 16 colours. With 640 x 512 dots to represent the 160 x 256 pixel screen, there are 8 dots (::::) per pixel – and 256 different ways of choosing a pattern.

Unfortunately many of these patterns are the same, as you will see if you type in and run Program 1, *Design*,

which shows, greatly enlarged, the patterns that can be made with eight dots to play with.

Even with patterns that are different, the eye often can't distinguish them.

So the flashing colours, logical numbers 8-15, are represented on paper as if they were the non-flashing colours 0-7.

This is done by ANDing the logical colour value with &07. That leaves eight patterns to choose, not too difficult a task.

In the machine code dumps *UCode* generated by Program II, *UDump*, information defining the patterns is stored in eight bytes of memory at the beginning of the program. This means that they can easily be altered.

How is this information translated into dots printed on paper? Essentially a screen dump program is a means whereby the graphics cursor is moved systematically to interrogate each pixel on the screen in turn, and return information about its state of illumination in the form of the logical colour number.

This is obtained by calling the operating system routine *Osword* with the accumulator set to 9, the machine code equivalent of the Basic function *POINT*.

A further call to *Osword* with A set to 11 will give data on the actual colour, but there's not much point in this as patterns have to be chosen to suit the particular screen display you wish to copy.

The cursor is moved in a manner which imitates the way the print head of the dot matrix printer travels across the paper, and as the print head has a vertical row of eight pins, in *UCode* dumps a column of four pixels is

# Make your screen dumps a shade more sparkling

Now you can print out effective tonal screen dumps with WILLIAM TREVELYAN's utility

```

10 REM Program 1
20 REM Design
30 DIM bit(7)
40 MODE6
50 VDU23,225,255,255,255
,255,255,255,255,255
60 INPUT TAB(0,5);"Enter
a number in hex (00 to FF)
: &"byte$
70 byteI=EVAL("&" + byte$)
80 B$="":BI=byteI
90 FOR IX=0 TO 7
100 IF BI MOD 2 THEN B$="
1"+B$:bit(IX)=225 ELSE B$="
0"+B$:bit(IX)=32
110 BI=BI DIV 2
120 NEXT IX
130 PRINT TAB(0,10);"You
have entered"
140 PRINT TAB(10,1);"&";by
te$;" = ";byteI;" = ";BI
150 PRINT TAB(20,20);"Pre
ss SPACE"
160 G=BET: IF G<>32 THEN
VDU7:GOTO160
170 :
180 MODE 4
190 VDU19,0,3;0;19,1,0;0;
200 FOR i=2 TO 20 STEP 2
210 PRINT TAB(0,i);"
";
220 FOR j=0 TO 6
230 PRINT CHR$bit(0);CHR$
bit(2);CHR$bit(4);CHR$bit(6
);:NEXT
240 PRINT TAB(0,i+1);"
";
250 FOR j=0 TO 6
260 PRINT CHR$bit(1);CHR$
bit(3);CHR$bit(5);CHR$bit(7
);:NEXT
270 NEXT i
280 G=BET: IF G=ASC("Q") T
HEN VDU7:MODE6:PRINT TAB(6,
12);"E N D O F P R O G R
A M":END ELSE IF G<>32 THEN
290 GOTO 40

```

Program 1: Design



examined before the cursor shifts to the right across the screen.

The logical colour value is used as an index, pointing to which pattern is to be transferred to the accumulator.

Thus if the colour is 4, the pattern stored at  $\&900+4$  goes into the accumulator. If this pattern corresponds to the hex number  $\&55$ , we have in the accumulator:

Bit	7	6	5	4	3	2	1	0
	0	1	0	1	0	1	0	1

To store this information in proper order until it can be sent to the printer, four bytes of memory are reserved starting at location *octet*.

The instruction LSR A shifts bit 0 of the accumulator into the carry, leaving 00101010 in A, and ROL *octet* moves the 1 in the carry into bit 0 of the first storage byte *octet*.

A repetition leaves 00010101 in A, with bit 0 of *octet* equal to 0 and bit 1 equal to 1.

This operation is repeated, but now the next two bits go to location *octet+1*, and so on, until the 8 bits of the pattern have all been transferred to bits 0 and 1 of the four storage bytes.

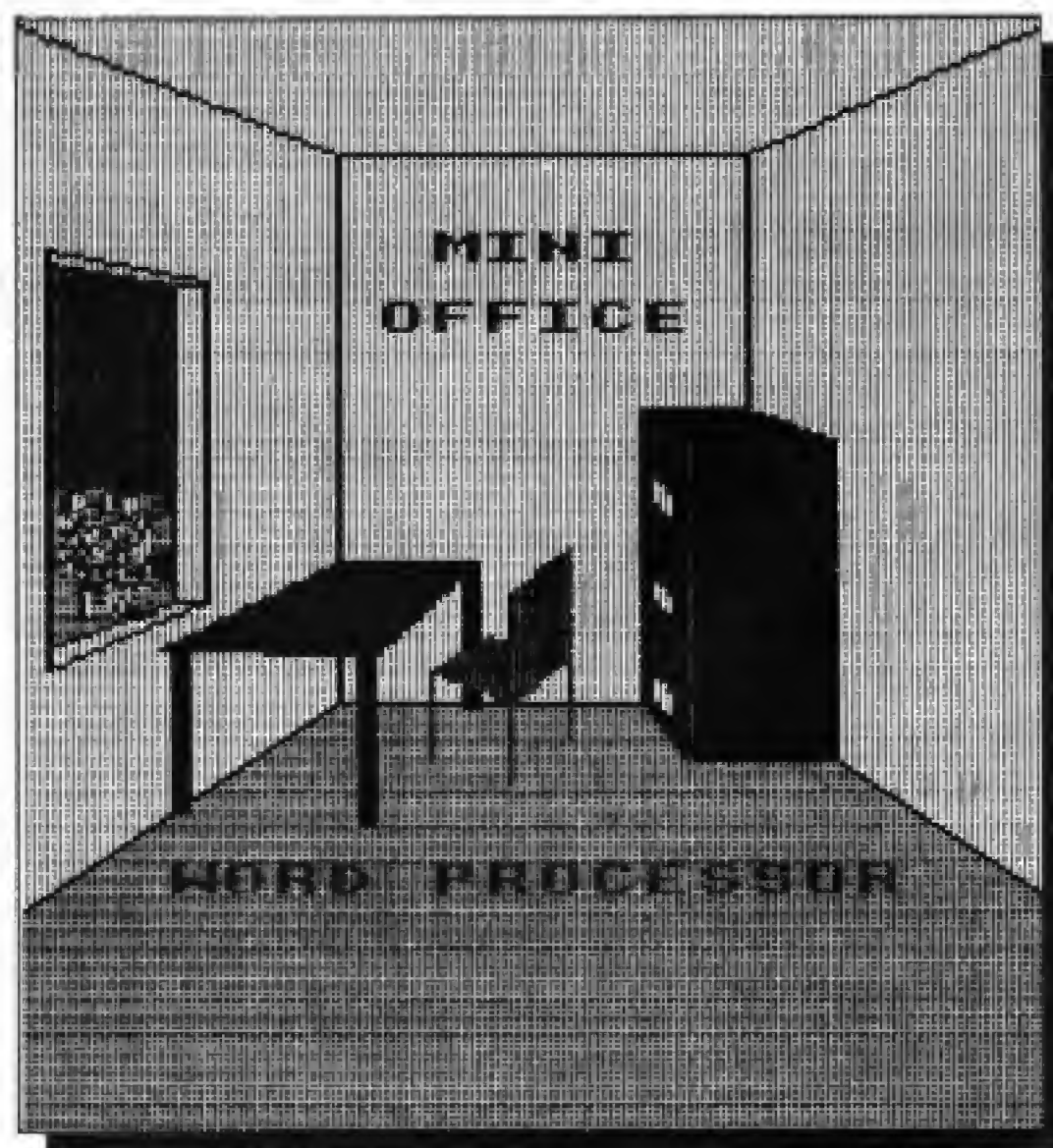
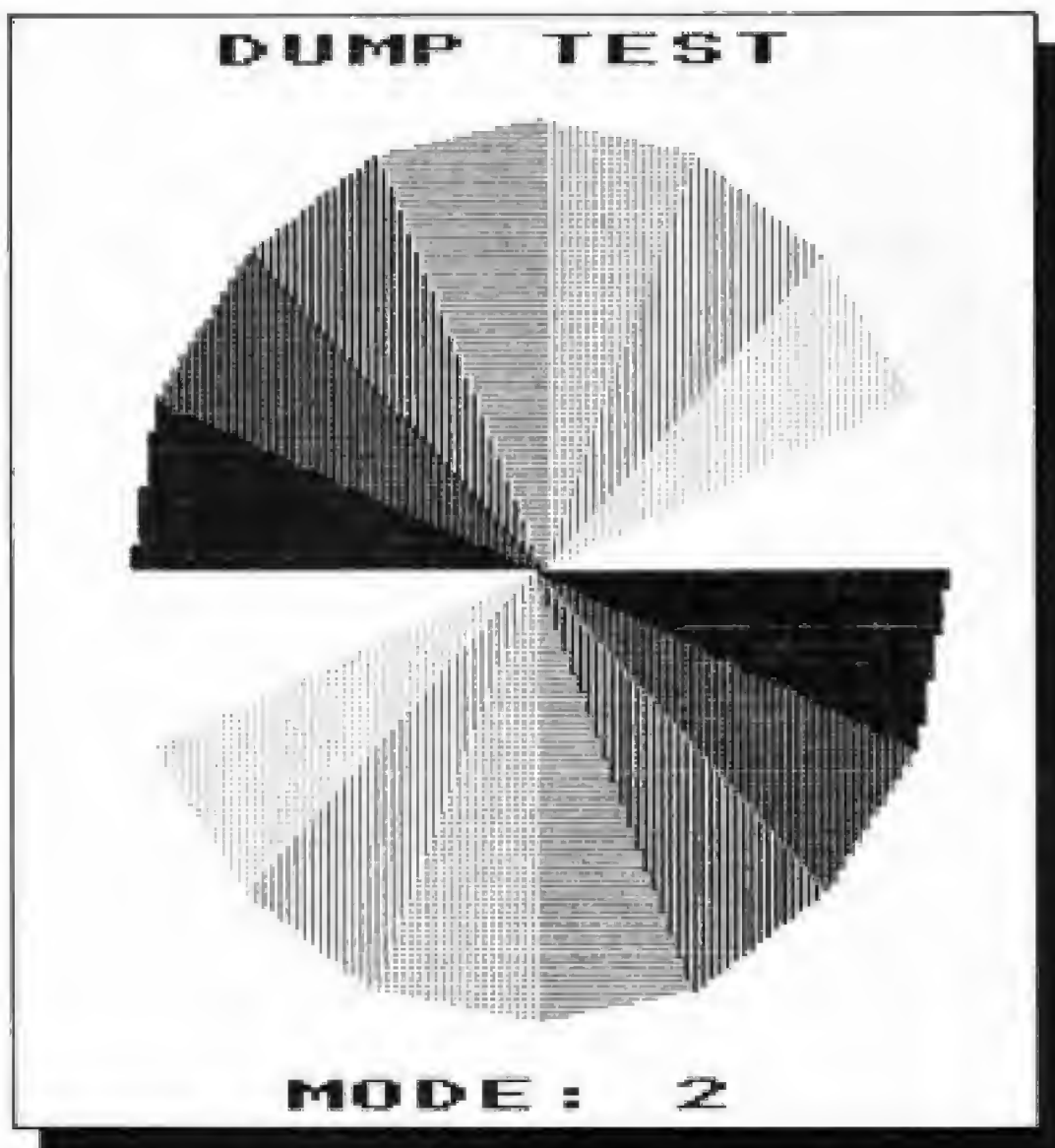
The same happens with the next pixel, and the next, and the next – and now all the bits of the four bytes *octet* to *octet+3* contain information on pixel colour, and this is transferred to the printer buffer.

If all four pixels return colour 4, what gets printed is:

1	1	1	1	pixel 1
0	0	0	0	
1	1	1	1	pixel 2
0	0	0	0	
1	1	1	1	pixel 3
0	0	0	0	
1	1	1	1	pixel 4
0	0	0	0	

where 1 means the printer makes a black dot on the paper and 0 that the paper is blank.

In Modes 1 and 4 only two bytes are prepared for printing.





```

10 REM Program II
20 REM UDump
30 REM Screen dump with
  patterns for Shinwa
40 :
50 osword=&FFF1:oswrch=&
  FFEE:osbyte=&FFF4
60 Xlo=&70:Yhi=&71:Ylo=&
  72:Yhi=&73
70 YYlo=&80:YYhi=&81
80 tint=&74:count=&75:oc
  tet=&76
90 pattern=&900:set=patt
  ern+8:pix=pattern+9
100 :
110 MODE6:INPUT TAB(12,12
  )"Enter MODE: "mode
120 IF mode >=6 VDU7:GOTO
  110
130 M=mode+1:ON M GOTO 15
  0,160,170,180,190,200
140 :
150 PROC0:GOTO 220

160 PROC1:GOTO 220
170 PROC2:GOTO 220
180 VDU7:GOTO 110
190 PROC4:GOTO 220
200 PROC5:GOTO 220
210 :
220 code=pattern+10
230 FOR pass=0 TO 3 STEP
  3
240 PX=code
250 [OPT pass
260 LDA #26:JSR oswrch \
  Set default screen
270 LDA #2:JSR oswrch \P
  rinter on
280 .clear JSR next
290 .line JSR esc
300 LDA #65:JSR oswrch
310 LDA #1:JSR oswrch
320 LDA #8:JSR oswrch \S
  et line spacing
330 .load LDA #252:STA YY
  lo

340 LDA #3:STA YYhi \Star
  t Y=1820
350 .new1 LDA #0:STA Xlo
360 STA Xhi \Start X=0
370 .bit JSR esc
380 LDA #75:JSR oswrch
390 LDA #1:JSR oswrch
400 LDA #128:JSR oswrch

410 LDA #1:JSR oswrch
420 LDA #2:JSR oswrch \64
  0 dots per line
430 .start LDA #4:STA cou
  nt
440 LDA YYlo:STA Ylo
450 LDA YYhi:STA Yhi
460 .test LDX #&70:LDY #0
  :LDA #9
470 JSR osword \Logical
  colour returned in &74
480 LDA tint:AND #7:TAY \
  Logical colour used as inde
  x to pattern

490 .byte LDX #0
500 LDA pattern,Y
510 .loop1 LSR A:ROL octe
  t,X \ROL requires X registe
  r
520 LSR A:ROL octet,X \
  2 bits transferred from pat
  tern to each byte in turn
530 INX:CPX set
540 BNE loop1
550 .loop2 DEC count
560 BEQ print
570 LDA Ylo
580 SEC:SBC #4
590 STA Ylo
600 LDA Yhi:SBC #0
610 STA Yhi
620 JMP test
630 .print LDX #0
640 .loop3 LDA #1:JSR osw
  rch
650 LDA octet,X:JSR oswrc
  h

```

Program II: UDump

## From Page 25

so that only bits 0 to 3 of the pattern bytes are used. Only two bits function in Mode 0 with one byte sent per pixel.

Type in the dump generator Program II and save it.

When it is run it asks for the number of a graphics mode to be entered, after which the appropriate machine code dump will be saved with the name *Udump* followed by the selected mode number.

Plus 3 owners should make sure that a disc is in the drive and has been \*MOUNTed.

In order to use the saved code – supposing it's Mode 5 you are interested in:

### \*LOAD UCODE5

will put the code into memory starting at &900. If you prefer another location substitute:

### \*LOAD UCODE5 A00

or whatever. Avoid page &0D (&0D00), though, if you have a Plus-1 fitted as some locations are involved with printer operation. The dump can be tucked away below PAGE as follows:

PAGE=&F00

### \*LOAD UCODE5 E00

This is convenient as a

change of mode doesn't alter PAGE as it does HIMEM. Plus 3 owners could raise PAGE to &1E00 and place the code at &1D00.

Now run Program III, *Anymode*, and switch on the printer. Answer Y to "Has the dump been loaded?" – and in 10 minutes (with the CP-80) a sectorised disc is printed which shows what the different patterns look like.

*Anymode* demonstrates two ways of loading and running a dump.

One is to load the dump in Mode 6, and then run the graphics program, into which has been inserted CALL &90A (load address + &0A), the "execution address" of the machine code program.

The second is to run the graphics program, which itself loads and runs the dump with \*RUN.

Tape owners should note that \*OPT1,0 must be included to stop messages referring to cassette loading ruining the screen display you want to copy, and \*FX16,0 is relied on to allow the program to load in Modes 0, 1 and 2.

Well, now you've seen them, you don't like the patterns? They're easy to change.

### PRINT \*!&900

and:

### PRINT \*!&904

will show you what you've got and:

!&900=&33221100

followed by:

!&904=&77665544

will change them. The figures 00,11 and so on stand for hex numbers in the range &00 to &FF (Mode 2/5); &00 to &0F (Mode 1/4); and &00 to &03 (Mode 0).

Program IV, *Pattern* will help you decide on suitable patterns. To use this program the appropriate *UCODE* dump must be loaded at &900 since the contents of certain addresses are altered to make the dump scan only the lower third of the screen.

This means the printout takes only three minutes as against 10 for *Anymode*, and 30 patterns cover only one A4 page.

As two patterns must be reserved to make the legend print black-on-white, only six experimental patterns are printed per trial. When printing stops, press the spacebar to continue and Q to exit from the program.

The first instruction in the *UCode* dump corresponds to VDU 26, which sets the graphics origin to the bottom left-hand corner, while gra-

phics and text windows cover the whole screen.

Put a display with windows on to the screen and dump it to the printer with CALL &90F, which misses out VDU 26. Some funny things can happen!

If your paper is less than eight inches wide Program V, *Sidedump* may interest you – the picture is printed sideways, 6 inches across by 7.5 inches deep.

However most difficulties are liable to arise because you have a printer with characteristics which differ from those of the CP-80. The programs assume the following:

- 640 dots can be printed in one line across the page.
- The command for this is ESC K n1 n2 where no. of dots =  $256 \times n2 + n1$  (VDU 1,27,1,75,1,128,1,1).
- The vertical spacing of dots (distance between dot wires) is the same as the horizontal spacing.
- The correct line feed spacing with no gap or overlap between lines is set with ESC A 8 (VDU 1,27,1,65,1,8).

If this doesn't apply to your printer, some surgery is needed – but the patient should survive.

Epson FX series dot matrix



```

660 INI:CPX set
670 BNE loop3
680 .xloop LDA Xlo
690 CLC:ADC pix
700 STA Xlo
710 LDA Xhi:ADC #0
720 STA Xhi \Increment X
to next pixel
730 CMP #5 \End of line?
(X=1280)
740 BNE start
750 JSR next \Start new
line
760 .yloop LDA YYlo
770 SEC:SBC #16
780 STA YYlo
790 LDA YYhi:SBC #0
800 STA YYhi \Down 4 pix
els
810 BCC end \Finish when
Y reaches 0
820 JMP new \Otherwise c
ontinue

```

```

830 .end LDA #1:JSR oswrc
h
840 LDA #7:JSR oswrch \B
rep
850 JSR esc
860 LDA #64:JSR oswrch \R
eturn printer to default se
tting
870 LDA #3:JSR oswrch \A
nd printer off
880 RTS
890 .esc LDA #1:JSR oswrc
h
900 LDA #27:JSR oswrch
910 LDA #1:JSR oswrch
920 RTS
930 .next LDA #1:JSR oswr
ch
940 LDA #10:JSR oswrch
950 RTS
960 ]
970 NEXT pass
980 CLS:PRINT""End of co

```

```

de &","PI
990 PRINT""
1000 OSCLI"SAVE"+&"+file#
"+&STR$~pattern"+&"+STR$
~&FF"+&"+STR$~code
1010 END
1020 :
1030 DEFPROC0
1040 !pattern=&FFFFFF00:!(
pattern+4)=&00000000
1050 ?set=1:pix=2:file#="
UCODE0"
1060 ENDPROC
1070 :
1080 DEFPROC1
1090 !pattern=&FF119900:!(
pattern+4)=&00000000
1100 ?set=2:pix=4:file#="
UCODE1"
1110 ENDPROC
1120 :
1130 DEFPROC2

```

```

1140 !pattern=&01119900:!(
pattern+4)=&FFC35557
1150 ?set=4:pix=8:file#="
UCODE2"
1160 ENDPROC
1170 :
1180 DEFPROC4
1190 !pattern=&FFFFFF00:!(
pattern+4)=&00000000
1200 ?set=2:pix=4:file#="
UCODE4"
1210 ENDPROC
1220 :
1230 DEFPROC5
1240 !pattern=&FF119900:!(
pattern+4)=&0000
1250 ?set=4:pix=8:file#="
UCODE5"
1260 ENDPROC

```

```

10 REM PROGRAM III
20 REM Anymode
30 REM Test Card
40 :
50 MODE6:INPUT TAB(5,10)
Mode: "mode
60 IF mode=3 OR mode>=6
VDU7:GOTO 50
70 INPUT TAB(5,10):"Has
dump been loaded? (Y/N) "A$
:IF A$<>"Y" AND A$<>"N" VDU
7:GOTO 70
80 MODE mode
90 file$="UCODE"+STR$mod
e
100 J=1+mode MOD 3
110 ON J GOTO 120,140,160
120 PRINT TAB(32,1):"D U
M P T E S T"
130 PRINT TAB(34,30):"M o
d e : "mode:GOTO 180
140 PRINT TAB(15,1):"DUMP
TEST"
150 PRINT TAB(16,30):"Mod
e : "mode:GOTO 180
160 PRINT TAB(5,1):"DUMP
TEST"
170 PRINT TAB(6,30):"MODE
: "mode:GOTO 180
180 MOVE 140,1012:DRAW 11

```

```

40,1012:DRAW1140,12:DRAW 14
0,12:DRAW 140,1012
190 :
200 PROCpolygon(640,512,4
00,15)
210 :
220 IF A$="N" THEN GOTO 2
50
230 CALL &90A
240 END
250 +OPT1,0
260 +FX16,0
270 OSCLI"RUN"+&"+file$
280 +OPT1,1
290 END
300 :
310 DEFPROCpolygon(PX,QX,
RX,SX)
320 MOVE PX+RX,QX
330 FOR NX=0 TO 240 STEP
SX
340 SCOL0,NXDIV#I-1
350 MOVE PX,QX
360 IX=RX#COS(NX#PI/120)
370 YI=RX#SIN(NX#PI/120)
380 PLOT85,XI+PX,YI+QX
390 NEXT
400 :
410 ENDPROC

```

```

10 REM PROGRAM IV
20 REM Pattern
30 REM Tests patterns fo
r duaps
40 :
50 ?&92A=44: ?&92E=1
60 REM To start at Y=300
70 REM Y MOD16 must=12 t
o avoid line at bottom of s
creen
80 :
90 MODE 6
100 PRINT"" Enter Four
bytes"" :STRING$(16,"-
")""** Must be 22YYXX(00)"
"" if background is to b
e white"
110 PRINT TAB(3,11) STRIN
G$(23,"="):INPUT TAB(3,10)"
!pattern : &A$
120 !&90B=EVAL("&"+A$)
130 PRINT"" Enter Four
bytes"" :STRING$(16,"-
")""** Must be FF11ZZYYXX"
"" if lettering is to be
black"
140 PRINT TAB(3,22) STRIN
G$(23,"="):INPUT TAB(3,21)"
!(pattern+4): &B$

```

```

150 !&904=EVAL("&"+B$)
160 A$=B$+A$
170 MODE 2
180 MOVE 0,280:DRAW 1200,
280
190 FOR j=0 TO 7
200 SCOL0,j
210 MOVE 20+150*j,256
220 MOVE 20+150*j,156
230 PLOT85,120+150*j,256
240 PLOT85,120+150*j,156
250 NEXT
260 VDU5
270 FOR i=1 TO 8
280 MOVE 20+150*(i-1),100
290 PRINT RIGHT$(A$,2)
300 A$=LEFT$(A$, (16-2*i))
310 NEXT
320 COLOUR 7:MOVE 0,24:DR
AW 1200,24
330 CALL &90A
340 VDU4:CLS:PRINTTAB(0,1
0):<Q> to end""<SPACE> t
o continue"
350 G$=GET$:IF G$="Q" THE
N VDU7:MODE6:END ELSE GOTO
90
360 END

```

Program III: Anymode

Program IV: Pattern



```

10 REM PROGRAM V
20 REM SideDump
30 REM Screen dump with
patterns
40 REM Y horizontal, X ve
rtical
50 :
60 osword=&FFF1:oswrch=&
FFEE:osbyte=&FFF4
70 Xlo=&70:Xhi=&71:Ylo=&
72:Yhi=&73
80 XXlo=&80:XXhi=&81
90 tint=&74:count=&75:oc
tet=&76
100 pattern=&900
110 !pattern=&FFA50100:!(
pattern+4)=&00000000:REM M
ode 5
120 set=pattern+0:?set=4
:REM 4 bits of pattern int
o each byte in Mode2/5
130 pix=pattern+9:?pix=8
:REM pixel 8x4 Mode2/5
140 code=pattern+10
150 FOR pass=0 TO 3 STEP
3
160 PX=code
170 [OPT pass
180 LDA #26:JSR oswrch \
Set default screen
190 LDA #2:JSR oswrch \P
rinter on
200 .line JSR esc
210 LDA #65:JSR oswrch
220 LDA #1:JSR oswrch
230 LDA #8:JSR oswrch \S
et line spacing
240 .load LDA #0:STA XXlo
250 STA XXhi \Start X=0
260 .newl LDA #0:STA Ylo
270 STA Yhi \Start Y=0
280 .bit JSR esc
290 LDA #75:JSR oswrch

```

```

300 LDA #1:JSR oswrch
310 LDA #0:JSR oswrch
320 LDA #1:JSR oswrch
330 LDA #2:JSR oswrch \51
2 dots per line
340 .start LDA #2:STA cou
nt
350 LDA XXlo:STA Xlo
360 LDA XXhi:STA Xhi
370 .test LDX #&70:LDY #0
:LDA #9
380 JSR osword \Logical
colour returned in &74
390 LDA tint:AND #7:TAY \
Logical colour used as inde
x to pattern
400 .byte LDX #0
410 LDA pattern,Y
420 .loop1 LSR A:ROL octe
t \8bits 0,2,4,6 into 1st by
te
430 LSR A:ROL octet+1 \B
its 1,3,5,7 into 2nd byte
440 INX:CPX set
450 BNE loop1
460 .loop2 DEC count
470 BEQ print
480 LDA Xlo
490 CLC:ADC pix
500 STA Xlo
510 LDA Xhi:ADC #0
520 STA Xhi
530 JMP test
540 .print LDX #0
550 .loop3 LDA #1:JSR osw
rch
560 LDA octet,X:JSR oswrc
h
570 INX:CPX #2
580 BNE loop3
590 .yloop LDA Ylo
600 CLC:ADC #4
610 STA Ylo

```

```

620 LDA Yhi:ADC #0
630 STA Yhi \Increment Y
to next pixel
640 CMP #4 \End of line?
(Y=1024)
650 BNE start
660 .next LDA #1:JSR osw
rch
670 LDA #10:JSR oswrch \S
tart new line
680 .xloop LDA Xlo
690 CLC:ADC #16
700 STA Xlo
710 LDA Xhi:ADC #0
720 STA Xhi \Down 8 dot
s
730 CMP #5:BEQ end \Finis
h when X reaches 1280
740 JMP newl \Otherwise c
ontinue
750 .end LDA #1:JSR oswrc
h
760 LDA #7:JSR oswrch \B
EEP
770 JSR esc
780 LDA #64:JSR oswrch \R
eturn printer to default se
tting
790 LDA #3:JSR oswrch \A
nd printer off
800 RTS
810 .esc LDA #1:JSR oswrc
h
820 LDA #27:JSR oswrch
830 LDA #1:JSR oswrch
840 RTS
850 ]
860 NEXT pass
870 CLS:PRINT""End of co
de &";~PX
880 PRINT""
890 +SAVE SCODE5 900 9FF
900

```

```

10 REM PROGRAM VI
20 REM EDump
30 REM Screen dump with
patterns
40 REM Modified for EPSO
N RX-80
50 :
60 osword=&FFF1:oswrch=&
FFEE:osbyte=&FFF4
70 Xlo=&70:Xhi=&71:Ylo=&
72:Yhi=&73
80 YYlo=&80:YYhi=&81
90 tint=&74:count=&75:oc
tet=&76
100 pattern=&900
110 !pattern=&05030100:!(
pattern+4)=&3F370F15:REM (
::) only 6 bits used
120 set=pattern+0:?set=3
:REM 3 bytes sent to print
er instead of 4
130 pix=pattern+9:?pix=8
:REM pixel 2x4 Mode0,4x4 M
ode1/4,8x4 Mode2/5
140 code=pattern+10
150 FOR pass=0 TO 3 STEP
3
160 PX=code
170 [OPT pass
180 LDA #26:JSR oswrch \
Set default screen
190 LDA #2:JSR oswrch \P
rinter on
200 .clear JSR next
210 .line JSR esc
220 LDA #65:JSR oswrch
230 LDA #1:JSR oswrch
240 LDA #8:JSR oswrch \S
et line spacing
250 .load LDA #252:STA YY
lo
260 LDA #3:STA YYhi \Star
t Y=1020

```

Program V: Sidedump

Program VI: Edump

## From Page 26

printers can print 72 dots/inch horizontally and vertically, but with only up to 576 dots/line.

The solution is to use the sideways dump with 512 dots/line. The command has to be changed to ESC "" (5) n1 n2 which means altering line 290 to:

```
290LDA #42:JSR oswrch
```

and inserting a line 295:

```
295LDA #5:JSR oswrch
```

Note the patterns won't have the same values. If the code overruns &9FF delete the beep instruction, lines 750,760.

The popular Epson RX series doesn't have the same spacing horizontally and vertically, so dumps are slightly distorted. For example, circles print as ellipses.

Look at page 50 of the May 1985 *Electron User* where the square drawn on the screen by

Demo is printed as a rectangle (1.2 x 1).

Newer models of the RX-80 support 640 dots per 8 inch line, command ESC "" (4) which must be substituted for ESC K in *UDump*.

Alternatively the ESC K command is retained, which in this printer corresponds to 480 dots per line (60 dots/inch).

The dump generator is rewritten in Program VI, *Edump*, for a field of 480 x 512 dots, giving a six dot

pattern (::) for Mode 2/5.

The number of patterns is cut from 256 to 64, but eight sufficiently different can be squeezed out.

For Mode 1 you would have to switch to dual density bit image printing ESC L, 960 dots/line and put ?pix equal to 4.

Of course, the supporting programs *Design*, *Anymode* and *Patterns* will need changing too, but this shouldn't present much difficulty. Let me know how you get on.



270 .new1 LDA #0:STA Xlo	r	630 LDA Xhi:ADC #0	return printer to default se
280 STA Xhi \Start X=0	440 LSR A:ROL octet,X \	640 STA Xhi \Increment X	tting
290 .bit JSR esc	2 bits transferred from pat	650 CMP #5 \End of line?	790 LDA #3:JSR oswrch \A
300 LDA #75:JSR oswrch	tern to each byte in turn	(X=1280)	nd printer off
310 LDA #1:JSR oswrch	450 INX:CPI set	660 BNE start	800 RTS
320 LDA #224:JSR oswrch	460 BNE loop1	670 JSR next \Start new l	810 .esc LDA #1:JSR oswr
330 LDA #1:JSR oswrch	470 .loop2 DEC count	ine	h
340 LDA #1:JSR oswrch \40	480 BEQ print	680 .yloop LDA YYlo	820 LDA #27:JSR oswrch
0 dots per line	490 LDA Ylo	690 SEC:SBC #16	830 LDA #1:JSR oswrch
350 .start LDA #4:STA cou	500 SEC:SBC #4	700 STA YYlo	840 RTS
nt	510 STA Ylo	710 LDA YYhi:SBC #0	850 .next LDA #1:JSR oswr
360 LDA YYlo:STA Ylo	520 LDA Yhi:SBC #0	720 STA YYhi \Down 4 pix	ch
370 LDA YYhi:STA Yhi	530 STA Yhi	els	860 LDA #10:JSR oswrch
380 .test LDX #470:LDY #0	540 JMP test	730 BCC end \Finish when	870 RTS
:LDA #9	550 .print LDX #0	Y reaches 0	880 ]
390 JSR osword \Logical	560 .loop3 LDA #1:JSR osw	740 JMP new1 \Otherwise c	890 NEXT pass
colour returned in #74	rch	ontinue	900 CLS:PRINT""End of co
400 LDA tinti:AND #7:TAY \	570 LDA octet,X:JSR oswr	750 .end LDA #1:JSR oswr	de &";~PI
Logical colour used as inde	h	760 LDA #7:JSR oswrch \B	910 PRINT"
x to pattern	580 INX:CPI set	770 JSR esc	920 *SAVE ECODE 900 9FF 9
410 .byte LDX #0	590 BNE loop3	780 LDA #64:JSR oswrch \R	0A
420 LDA pattern,Y	600 .xloop LDA Xlo		
430 .loop1 LSR A:ROL octe	610 CLC:ADC pix		
t,X \ROL requires X registe	620 STA Xlo		

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The day before the contest the organisers introduce approximately 600lb of fish, of varying weights to the river.

But an hour later they received a phone call from a member of the Organisation Against Cruelty to Fish saying they had put several 40lb pike into the river.

Deciding against postponing the competition, the organisers agreed to warn the anglers before the competition started so you have been supplied with the correct equipment to land these monsters. But beware, they are amazingly strong.

When reeling in any fish you have to tap the key as fast as possible so the heavier the fish the more tiring it will be to reel in.

If, while this is happening, the fish should take the line outside the screen area, you will be fishing in another angler's peg and, as competition is fierce, he will become very irate and cut your line, wasting valuable time.

The larger fish lie further out, so the extra time taken to reel in will benefit your overall weight of fish when the end of the contest arrives.

All anglers are given a time limit of five minutes to catch as many fish as possible. When the time is up the fish caught by each angler will be weighed and a table displayed showing the order of anglers, along with their final weight of fish caught.

Your result is repeatedly flashed on and off to highlight your position. If two anglers gain exactly the same weight, the one with the lowest number of fish comes first in the table.

# FISHING

By MICHAEL KELSALL





## PROCEDURES

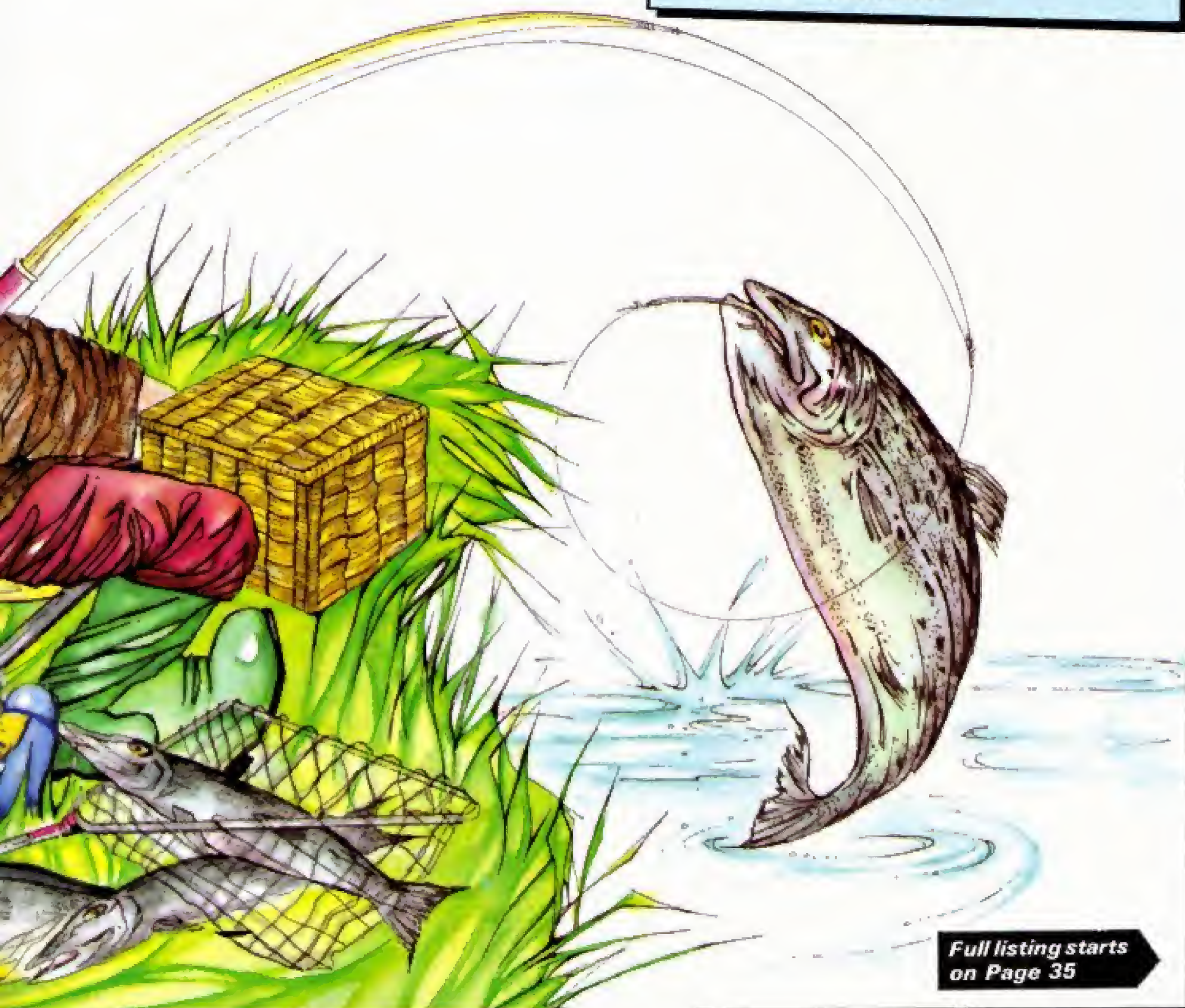
<b>graphics</b>	Creates user defined characters.
<b>title_page</b>	Draws title page and inputs player's name.
<b>initialise</b>	Defines variables and weather conditions.
<b>input_data</b>	Inputs the tackle you require.
<b>penalty</b>	Calculates penalties for using wrong bait.
<b>river</b>	Draws river scenario.
<b>catch_fish</b>	Allows you to fish for exactly five minutes.
<b>times_up</b>	Tells you to stop fishing.
<b>weigh_in</b>	Prints the results and awards prizes to winner.

## CONTROLS

A - Short cast.  
Z - Long cast.  
Space - Strike, or recast line if no fish hooked.  
:- Reel in line when fish is hooked.

## VARIABLES

<b>name\$(1-7)</b>	Stores angler's names.
<b>weight\$(1-7)</b>	Stores angler's weights.
<b>fishcaught%</b>	Number of fish caught.
<b>fw%</b>	Weight of last fish caught.
<b>xpos%</b>	X coordinate of angler.
<b>ypos1%</b>	Y coordinate of float 1.
<b>ypos2%</b>	Y coordinate of float 2.
<b>cast%</b>	0 if you haven't cast out, 1 if short cast, 2 if long cast.
<b>weather%</b>	Random number to pick type of weather.
<b>weather\$</b>	One of three weather conditions.
<b>depth%</b>	Random depth of river.
<b>penalty%</b>	Number of penalties against you for using wrong tackle.
<b>bait%</b>	Bait used.
<b>hooksize%</b>	Size of hook used.
<b>hookdepth%</b>	Depth of hook.
<b>ounces%</b>	Ounces of shot used.
<b>flow%</b>	Random number to pick speed of river.
<b>fish%</b>	1 if fish is taking bait, 0 if not.
<b>float%</b>	Number of times float bobs up and down.
<b>strike%</b>	Length of time given for player to strike.
<b>X%</b>	X coordinate of end of line.
<b>Y%</b>	Y coordinate of end of line.
<b>winner\$</b>	Name of winner.



Full listing starts  
on Page 35



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## From Page 33

```

10 REM FISHING
20 REM By Michael Kelsall
30 REM (c) Electron User
40 REM
50 IF PAGE=4000 THEN GOT
0 90
60 *KEY0 *MO.6: *FX3,21M*
TAPE:INFOR X1=PAGE TO TOP ST
EP 4: ! (4000+(X1-PAGE))=X1:
NEXT:PAGE=4000:MOLD:NRUN:M*
70 *FX130,0,120
80 END
90 *FX3,0
100 MODE1
110 DIMname$(7),weight$(7)
120 PROCgraphics
130 PROCtitle_page
140 PROCinitialise
150 PROCinput_data
160 PROCpenalty
170 VDU23:8202:0;0;0;
180 PROCriver
190 PROCcatch_fish
200 PROCtimes_up
210 MODE1
220 VDU23:8202:0;0;0;
230 PROCweigh_in
240 RUN
250 DEFPROCgraphics
260 VDU23,224,4,4,66,66,3
4,33,33,33,23,225,0,0,20,20
,17,17,34,34,23,226,33,145,
149,149,85,80,66,2,23,227,3
4,40,60,60,84,80,16,16,23,2
20,0,0,0,20,20,0,0,0,23,229
,0,0,0,0,20,0,0,0
270 VDU23,230,240,240,232

```

```

,160,136,254,14,7,23,231,0,
0,0,0,0,0,3,23,232,3,3,4,
11,14,51,196,0,23,233,15,55
,207,62,252,212,60,206,23,2
34,12,40,192,0,0,0,0,0
280 VDU23,235,17,34,50,59
,59,123,247,15,23,236,26,50
,116,212,204,202,145,16,23,
237,0,0,0,0,0,126,129,23,
230,0,0,1,0,0,1,1,131,23,23
9,99,27,6,7,7,3,4,0
290 VDU23,240,7,7,127,254
,220,92,60,206,23,241,0,0,1
,0,0,1,1,3,23,242,0,0,0,3,1
2,40,192,0,23,243,20,54,126
,126,60,24,60,126,23,244,20
,54,62,20,0,62,0,0
300 *KEY100:NRUN:M
310 ENDPROC
320 DEFPROCtitle_page:CLS
330 VDU19,1,2;0;19,2,4;0;
340 VDU20,5,15,34,11:COLD
UR129:CLS
350 VDU20,5,23,34,16:COLD
UR130:CLS
360 VDU26:COLOUR0:COLOUR1
29
370 PRINTTAB(24,13);VDU2
41,230
380 PRINTTAB(23,14);VDU2
31,232,233
390 PRINTTAB(22,15);VDU2
42,234,235,236
400 COLOUR2:PRINTTAB(20,1
4);VDU224,225,0,0,10,226,2
27
410 COLOUR1:COLOUR130:PRI
NTTAB(16,16);VDU224,225,0,
0,10,226,227
420 PRINTTAB(29,16);VDU2
24,225,0,0,10,226,227

```

```

430 COLOUR3:PRINTTAB(13,2
2);VDU220
440 COLOUR120:COLOUR3
450 GCOL0,3:MOVE700,512:D
RAW454,316
460 PRINTTAB(12,2);"UNITE
D KINGDOM";TAB(11,3);"FISHI
NG CONTEST."
470 PRINTTAB(12,6);"SPONS
ORED BY:-";TAB(11,8);"MK RE
SEARCH Ltd."
480 PRINTTAB(2,30);"Progr
am written by Michael Kelsa
ll."
490 PRINTTAB(9,25);"PLEAS
E TYPE YOUR NAME";TAB(9,26)
;"(Upto 15 Characters)";
500 INPUTTAB(11,28);name$
(1);IFLEN(name$(1))>15:CLS:
GOTO130
510 ENDPROC
520 DEFPROCinitialise:*FX
4,1
530 fishcaught:=0:fw:=0:x
pos:=RND(26)+10:ypos:=16:y
pos:=30:cast:=0:re:=0:flag:=
0:weather:=RND(3):depth:=R
ND(20)+10:penalty:=RND(10)
540 FORloop:=2TO7:READn$:
name$(loop)=n$:weight$(loo
p)=RND(65):NEXTloop
550 DATAMichael Kelsall,R
obert Kelsall,Shaun Wilson,
Nigel Saunders,David Sturge
ss,Gary Gregory
560 IFweather=1 weather$
="Sunny.":rechait:=7:rechoo
k:=15:rechookdepth:=depth-
1
570 IFweather=2 weather$
="Cloudy.":rechait:=3:rechoo
k:=17:rechookdepth:=depth-
2
580 IFweather=3 weather$
="Raining.":rechait:=2:rechoo
k:=14:rechookdepth:=depth
1-3
590 flow:=RND(3)
600 IFflow=1 flow$="Fas
t.":reounces:=4
610 IFflow=2 flow$="Ste
ady.":reounces:=3
620 IFflow=3 flow$="Slo
w.":reounces:=2
630 ENDPROC
640 DEFPROCinput_data:CLS
650 PRINTTAB(15,0);"Fishi
ng Log."
660 PRINTTAB(6,2);"Weathe

```

```

r:- ";weather$
670 INPUTTAB(2,4);"What h
ook size (10-23)";hooksize:=
IFhooksize<10ORhooksize>
25 GOTO670
680 PRINTTAB(2,6);"Which
bait:-";TAB(15,7);"1..Lunch
eon Meat";TAB(15,8);"2..Che
ese"
690 PRINTTAB(15,9);"3..Ea
rthworms";TAB(15,10);"4..Br
ead";TAB(9,12);"Maggots:-"
700 PRINTTAB(15,14);"5..B
ronze";TAB(15,15);"6..White
";TAB(15,16);"7..Mixed";TAB
(15,17);"8..Casters"
710 PRINTTAB(10,19);"Pres
s 1-8 for bait"
720 bait:=GET:IFbait<49D
Rbait>56THEN720
730 PRINTTAB(2,22);"The w
ater has a depth of ";depth
"; metres."
740 INPUTTAB(2,23);"What
depth are you fishing at";h
ookdepth:=IFhookdepth>dept
h1-.50Rhookdepth<.5 GOTO74
0
750 PRINTTAB(2,26);"The w
ater is flowing. ";flow$
760 INPUTTAB(2,28);"How m
any ounces of lead-free sho
t are you going to use (1-1
0)";ounces:=IFounces<10Rou
nces>10 GOTO760
770 ENDPROC
780 DEFPROCpenalty
790 IFhooksize<>rechook:=
penalty:=penalty+2
800 IFbait<40<>rechait:=
penalty:=penalty+2
810 IFhookdepth<>rechook
depth:=penalty:=penalty+2
820 IFounces<>reounces:=
penalty:=penalty+2
830 ENDPROC
840 DEFPROCriver:CLS
850 VDU19,0,4;0;19,1,2;0;
19,2,0;0;
860 VDU20,0,10,39,0:COLOU
R129:CLS:VDU26
870 VDU20,0,5,39,0:COLOUR
130:CLS:VDU26
880 COLOUR129:COLOUR0:PRI
NTTAB(17,10);VDU224,225,32
,32,32,32,224,225,224,225
890 COLOUR120:COLOUR1:PRI

```





## From Page 35

```

NTTAB(17,11);VDU226,227,32
,32,32,32,226,227,226,227
900 PRINTTAB(4,12);VDU22
4,225,10,0,0,226,227,32,224
,225,10,0,0,226,227,32,32,3
2,32,32,32,224,225,10,0,0,2
26,227
910 PRINTTAB(31,11);VDU2
24,225,10,0,0,226,227,32,32
,32,32,224,225,10,0,0,226,2
27
920 COLOUR130:COLOUR3
930 PRINTTAB(4,0);"United
Kingdom Fishing Contest.";
TAB(1,2);"Peg no.: 1 - ";na
me$(1);TAB(1,3)"Number of f
ish caught.";TAB(1,4);"Weig
ht of last fish (lb).";
940 PRINTTAB(32,2);"Total
";TAB(32,3);"weight.";TAB(2
4,3);"0";TAB(27,4);"0";TAB(
33,4);"0lb"
950 ENDPROC
960 DEFPROC catch_fish
970 COLOUR129:COLOUR2:TIM
E=0
980 COLOUR128
990 PRINTTAB(xpos1-7,ypos
1X);" ";PRINTTAB(xpos1-7,y
pos2X);" "
1000 COLOUR2:COLOUR129
1010 IFcast1=0 PRINTTAB(xp
os1-1,9);" "
1020 IFex1=1 AND flag1=1 MO
VE(xpos1-1)+32,700:BCOL4,0:
DRAW(xpos1-6)+32,505
1030 IFex1=1 AND flag1=2 MO
VE(xpos1-1)+32,700:BCOL4,0:
DRAW(xpos1-6)+32,75
1040 ex1=0
1050 IFcast1=1 OR cast1=2
GOTO1180
1060 PRINTTAB(xpos1,7);VD
U237,238,230
1070 PRINTTAB(xpos1,8);VD
U32,239,240
1080 PRINTTAB(xpos1,9);VD
U32,235,236
1090 REPEAT
1100 IFTIME>=30000 GOTO181
0
1110 A$=INKEY$(3)
1120 IFA$="A" PRINTTAB(xpo
s1-1,7);VDU32,32,241,230:P
RINTTAB(xpos1-1,8);VDU32,2
31,232,233:PRINTTAB(xpos1-1
,9);VDU242,234,235,236:COL

```

```

OUR3:COLOUR128:PRINTTAB(xpo
s1-7,ypos1X);VDU228:cast1=
1:COLOUR129:COLOUR2
1130 IFA$="I" PRINTTAB(xpo
s1-1,7);VDU32,32,241,230:P
RINTTAB(xpos1-1,8);VDU32,2
31,232,233:PRINTTAB(xpos1-1
,9);VDU242,234,235,236:COL
OUR128:COLOUR3:PRINTTAB(xpo
s1-7,ypos2X);VDU228:cast1=
2:COLOUR129:COLOUR2
1140 UNTILcast1<>0
1150 MOVE(xpos1-1)+32,700
1160 IFcast1=1 BCOL4,0:DRA
W(xpos1-6)+32,505
1170 IFcast1=2 BCOL4,0:DRA
W(xpos1-6)+32,75
1180 fish1=RND(200)-RND(pe
naltyX)
1190 A$=INKEY$(0):IFA$=" "
flag1=cast1:ex1=1:cast1=0:G
OTO980
1200 IFTIME>=30000 GOTO181
0
1210 IF fish1<>1 GOTO1180
1220 COLOUR128:COLOUR3
1230 float1=RND(6):REPEAT
1240 IFTIME>=30000 GOTO181
0
1250 IFcast1=1 PRINTTAB(xp
os1-7,ypos1X);VDU228
1260 IFcast1=2 PRINTTAB(xp
os1-7,ypos2X);VDU228
1270 n1=TIME:REPEATUNTILT1
ME>n1+100
1280 A$=INKEY$(0):IFA$=" "
flag1=cast1:ex1=1:cast1=0:G
OTO980
1290 IFcast1=1 PRINTTAB(xp
os1-7,ypos1X);VDU229
1300 IFcast1=2 PRINTTAB(xp
os1-7,ypos2X);VDU229
1310 n1=TIME:REPEATUNTILT1
ME>n1+100
1320 A$=INKEY$(0):IFA$=" "
flag1=cast1:ex1=1:cast1=0:G
OTO980
1330 float1=float1-1:UNTIL
float1<=0
1340 COLOUR128:PRINTTAB(xp
os1-7,ypos1X);VDU32:PRINTT
AB(xpos1-7,ypos2X);VDU32
1350 strike1=RND(55)+5:REP
EAT
1360 IFTIME>=30000 GOTO181
0
1370 A$=INKEY$(0)
1380 IFA$=" " AND cast1=1
MOVE(xpos1-1)+32,700:BCOL4,

```



```

0:DRAW(xpos1-6)+32,505
1390 IFA$=" " AND cast1=2
MOVE(xpos1-1)+32,700:BCOL4,
0:DRAW(xpos1-6)+32,75
1400 COLOUR2:COLOUR129
1410 IFA$=" " PRINTTAB(xpo
s1,7);VDU237,238,230:PRINT
TAB(xpos1,8);VDU32,239,240
:PRINTTAB(xpos1-1,9);VDU32
,32,235,236:flag1=cast1:cas
t1=0:loop1=0:GOTO1480
1420 strike1=strike1-1:UNT
ILstrike1<2
1430 COLOUR3:COLOUR128
1440 IFcast1=1 PRINTTAB(xp
os1-7,ypos1X);VDU228
1450 IFcast1=2 PRINTTAB(xp
os1-7,ypos2X);VDU228
1460 IFTIME>=30000 GOTO181
0
1470 GOTO1800
1480 *FX12,255
1490 IFflag1=1 Y1=505:fw1=
RND(4)+1
1500 IFflag1=2 Y1=75:fw1=R
ND(8)+3
1510 IFRND(11)<.005 fw1=40
1520 X1=(xpos1-6)+32
1530 BCOL4,0:MOVExpos1+32,
767:DRAWX1,Y1
1540 REPEAT
1550 IFTIME>=30000 GOTO181
0
1560 A$=INKEY$(0)

```

```

1570 *FX15,1
1580 BCOL4,0:MOVExpos1+32,
767:DRAWX1,Y1
1590 X1=X1+RND(50):X1=X1-R
ND(50):Y1=Y1-fw1+2
1600 IFfw1<40 GOTO1630
1610 IFhooksize1>13 GOTO16
00
1620 IFhooksize1<13ANDA$="
":THENY1=Y1+RND(27)+15:SOUD
03,-15,5,1
1630 IFA$=":" Y1=Y1+RND(4)
+11:SOUD03,-15,5,1
1640 BCOL4,0:MOVExpos1+32,
767:DRAWX1,Y1
1650 IFY1<50R1X<50R1X>1270
GOTO1680
1660 UNTILY1>=660
1670 BCOL4,0:MOVExpos1+32,
767:DRAWX1,Y1:GOTO1700
1680 BCOL4,0:MOVExpos1+32,
767:DRAWX1,Y1
1690 SOUD08,-15,5,2:GOTO18
30
1700 COLOUR0
1710 IFfw1<6 PRINTTAB(xpos
1-1,8);VDU244
1720 IFfw1>=6 PRINTTAB(xpo
s1-1,8);VDU243
1730 COLOUR3:COLOUR130
1740 fishcaught1=fishcaugh
t1+1:PRINTTAB(24,3);fishcau
ght1
1750 PRINTTAB(27,4);fw1;"

```



```

1760 weightZ(1)=weightZ(1)
+weightZ
1770 PRINTTAB(33,4);weight
Z(1);"lb"
1780 COLOUR2:COLOUR128
1790 IFTIME>=30000 GOTO181
8
1800 GOTO1000
1810 floatZ=0:strikeZ=0:lo
opZ=0:ENDPROC
1820 DEFPROCtimes_up
1830 LOCALY1,loopZ
1840 COLOUR3
1850 VDU28,0,31,39,25:COLO
UR128:CLS
1860 VDU28,0,27,39,25
1870 COLOUR3
1880 PRINTTAB(12,2);" STOP
FISHING!"
1890 FORloopZ=1TO30:SOUND3
,-15,2,1:NEXTloopZ
1900 PRINTTAB(12,2);" TIM
E'S UP!"
1910 FORloopX=1TO30:SOUND3

```

```

,-15,3,1:NEXTloopX
1920 FORloopX=1TO30:SOUND3
,-15,4,1:NEXTloopX
1930 COLOUR128
1940 VDU26:COLOUR130:FORlo
opZ=1TO1500:NEXTloopZ
1950 SOUND3,-15,50,5:SOUND
3,-15,60,5
1960 FORY1=0TO33:PRINT:PRI
NT:NEXTY1
1970 ENDPROC
1980 DEFPROCweigh_in:CLS
1990 VDU19,1,8;0;
2000 LOCALloopX,1X
2010 COLOUR2
2020 PRINTTAB(4,1);"UNITED
KINGDOM FISHING CONTEST";T
AB(5,2);"SPONSORED BY MK RE
SEARCH Ltd."
2030 COLOUR3
2040 PRINTTAB(1,4);"Positi
on";TAB(11);"Name";TAB(27);
"Weight (lb)"
2050 MOVE16,900:DRAW16,584
2060 MOVE336,900:DRAW336,5

```

```

84
2070 MOVE864,900:DRAW864,5
84
2080 MOVE1264,900:DRAW1264
,584
2090 MOVE16,900:DRAW1264,9
00
2100 MOVE16,852:DRAW1264,8
52
2110 MOVE16,584:DRAW1264,5
84
2120 pZ=1
2130 FORloopZ=80TO8STEP-1
2140 FOR1X=1TO7
2150 IFweightZ(1)=loopZAND
1Z=1 COLOUR1ELSECOLOUR3
2160 IFweightZ(1Z)=loopZ P
RINTTAB(5,pZ+5);pZ;TAB(11,p
Z+5);name$(1Z);TAB(31,pZ+5)
;weightZ(1Z);pZ=pZ+1:IFpZ=1
=1 winner$=name$(1Z)
2170 NEXT1X
2180 NEXTloopZ
2190 COLOUR3
2200 PRINTTAB(2,15);"The w

```

```

inner,"winner$";", will";T
AB(1,16);"receive";TAB(3,1
8);"Ten years supply of mag
gots of their choice.";T
AB(3,21);"The MK solid Gold
Trophy;"
2210 COLOUR130
2220 PRINTTAB(9,23);"UNITE
D KINGDOM ANGLER";TAB(9,24)
;" OF THE YEAR. ";TA
B(9,25);"
";TAB(9,26);" PRESENT
ED TO: ";TAB(9,27);SPC(2
1);TAB(8,28);SPC(23);TAB(12
,27);winner$
2230 COLOUR128
2240 PRINTTAB(10,30);"Pres
s a key to fish."
2250 *FX15,1
2260 A=GET:ENDPROC

```

This listing is included in this month's cassette tape offer. See order form on Page 61.

EPIC ADVENTURES...EPIC ADVENTURES...EPIC ADVENTURES...EPIC ADVENTURES...EPIC ADVENTURES



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Electron User October 1985.

## ADVENTURES

### The Wheel of Fortune

All Epic Adventures contain the following features:

- Written in machine code to give fast response
- At least 220 fully described locations
- Commands can be entered as full sentences
- Fast game-save on tape
- Large vocabulary
- Lots of objects, treasures and puzzles to solve

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LAST month we looked at how to intercept the Electron's Basic error handling routine to check for the new keyword B, for BEEP.

In this article we will be taking this process one step further by adding more than one new keyword and allowing them to be as many characters long as we like.

To recap, in getting the Electron to recognise B as a keyword we intercepted the Break (BRK) vector, stored at locations &202 and &203 and checked all errors coming through for Mistake.

If an error was Mistake we then checked to see whether or not it was caused by our new keyword.

If you look at Program 1, ABC for Added Basic Commands you will see that up to just before *comploop* it is virtually identical to the program BEEP from my last article.

The differences begin at line 1070 where we store the location of the start of a table that contains our new keywords, shown in Table 1.

Before we go any further let's have a quick look at this table (lines 1660-1900). The table follows the format:

```
New keyword
Zero byte
Action address
New keyword
Zero byte
Action address
...
...
Table-end marker
```

The new keywords are followed by a zero byte so that we can recognise the end of each keyword while checking for a match.

The action addresses point to where the keyword's corresponding routine commences.

If the table-end marker is reached while checking it naturally notifies ABC that the Mistake error was not caused by one of our new keywords.

Character 58 has been used as the table-end marker because it is a colon and, being a statement separator, can not

# Extend your vocabulary to something more than a one letter word

By ROBIN NIXON

be used as part of a variable or keyword.

Right, back to *comploop*. Line 1140 sets register Y to zero. This will be used as our offset into words in the keyword table that are being checked.

Then lines 1180 to 1250 check through a keyword until a match has been found. If zero is encountered we have a match so line 1190 branches to *found*.

Line 1200 checks whether we've tested all the keywords and, if so, line 1210 branches to *notcommand* which exits to Basic's own error handler.

Otherwise, lines 1290 to 1340 call *incmatch* (lines 1530-1620) which increments our pointer into the keyword table to point to the start of the next keyword, and then jump back into *comploop* to continue checking for a match.

If we've reached line 1380 we must have found a match and the Mistake was caused by one of our new keywords, so we store the contents of register Y, which now contains the length of the keyword, in *offset*.

You will see later how this is used to increment the Basic

interpreter's pointer into the program.

Then line 1390 increments Y to point to the low byte of the keyword's action address and lines 1400 and 1410 store it in *acadd1*. Likewise, lines 1420 to 1440 store the high byte in *acadd2*.

Now for a bit of devious programming. As you may know, when a JSR - jump to subroutine - is encountered, the location of the next instruction following the JSR is pushed on to the 6502 stack so that the processor knows

where to continue execution once the subroutine has been completed.

If we push our own return address on to the stack and simply JMP (jump) to a subroutine, the processor will resume execution at the address it finds on the stack.

This is exactly what lines 1450 to 1490 do. They load the low and high byte of *quit-1* and push them on the stack.

The -1 is there because, after an RTS, the 6502 increments the program counter to point to the next instruction.

This means that once a

<b>BEEP</b>	Causes a beep as with VDU 7.
<b>SWAP A%,B%</b>	Swaps the values of two integer variables. A% and B% can be any two integer variables.
<b>ZEROINT</b>	Clears the values of all integer variables to zero.
<b>INVERSE</b>	Inverses the foreground and background text colours.
<b>NORMAL</b>	Sets the foreground and background text colours to normal.
<b>FRAME</b>	Waits for the electron beam to fly back to the start before updating the screen and is useful for preventing flickering during animation.
<b>SCRON</b>	Turns on output to the screen.
<b>SCROFF</b>	Turns off output to the screen.

Table 1: The extra keywords provided by ABC



keyword subroutine has been executed the RTS at the end will force the processor to jump to *quit*, which will then tidily leave *ABC*.

Having pushed this address on the stack, line 1490 jumps to the location stored in *acadd1* and *acadd2* which is where we stored the action address of the keyword.

Before examining the coding of the new keywords let's just have a look at *quit* (line 3270).

Lines 3270 to 3310 take the contents of *offset* – the length of the keyword – and update the program pointer PTR to the byte following the keyword.

This is so that when we return execution to the Basic interpreter it does not encounter our keyword again.

And, as in *BEEP*, line 3320 moves PTR to the next

statement separator or program line, lines 3330 to 3400 pull unwanted error handling information from the stack and line 3410 passes control back to the interpreter.

We are now ready to look at the new keyword routines.

Lines 1940 to 1960 are the familiar *BEEP*.

Lines 1980 to 2640 swap the values of two integer variables. Lines 2000 to 2080 strip any spaces between *SWAP* and the first variable.

Lines 2120 to 2160 get the first variable name and put it in *vname1*, then lines 2170-2250 put the second variable name in *vname2*.

After that lines 2260 to 2430 call *swap1* (lines 2480-2640) which swaps the contents of the two variables held in page 4.

Line 2440 RTS returns using the address we pushed

on to the stack.

*zeroloop*, lines 2730 to 2770, simply sets the values of all integer variables to zero.

*Inverse* and *normal*, lines 2810 to 3010, inverse the text foreground and background colours using VDU 17.

Lines 3050 to 3070 do a \*FX 19 which causes any updating of the screen to wait until the electron beam flies back to the top left hand side of the screen.

This helps to eliminate flicker during animation but does slow programs down.

Finally *scron* and *scroff* turn screen output on and off by doing either:

\*FX 3,2

for screen off, or:

\*FX 3,0

for screen on.

Phew, that's quite a bit of

code, but we got there in the end.

When you've finished typing in Program 1, I suggest you save it as *ABC-SOURCE* (the SOURCE being for source file) before running it. When run it will automatically save the assembled object code as *ABC*.

As the code assembles at &B00 you won't be able to use the function keys or user defined characters.

If you do need to use them I suggest you assemble the code elsewhere by altering line 420.

Also, if you have a Plus 3, don't forget to type:

\*MOUNT

before you run the program.

● Next month we'll look at how to add the loop structure *WHILE...WEND* to our set of extra keywords.

```

100 REM *****
110 REM *
120 REM *   ABC   *
130 REM *
140 REM * Added Basic *
150 REM * Commands *
160 REM *
170 REM * By Robin *
180 REM *   Nixon *
190 REM *
200 REM * (c) Electron *
210 REM *   User   *
220 REM *
230 REM *****
240 REM
250 MODE 8
260 osrch=&FFEE
270 osbyte=&FFF4
280 checkend=&9B57
290 continue=&B99B
300 newbrk1=&70
310 newbrk2=&71
320 vname1=&72
330 vname2=&73
340 ptr1=&80
350 ptr2=&81
360 keytab1=&82
370 keytab2=&83
380 acadd1=&84

390 acadd2=&85
400 offset=&86
410 FOR PASS=0 TO 3 STEP 3
420 PX=&B000
430 [
440 OPT PASS
450 \
460 .start
470 \
480 LDA &202
490 LDX &203
500 CMP #main MOD &100
510 BNE changebrkvector
520 CPI #main DIV &100
530 BEQ alreadychanged
540 \
550 .changebrkvector
560 \
570 STA newbrk1
580 STX newbrk2
590 LDA #main MOD &100
600 STA &202
610 LDA #main DIV &100
620 STA &203
630 \
640 .alreadychanged
650 \
660 RTS
670 \

680 .main
690 \
700 PHP
710 PHA
720 TYA
730 PHA
740 TXA
750 PHA
760 LDY #0
770 LDA (&FD),Y
780 CMP #4
790 BEQ checkcommand
800 \
810 .notcommand
820 \
830 PLA
840 TAX
850 PLA
860 TAY
870 PLA
880 PLP
890 JMP (newbrk1)
900 \
910 .checkcommand
920 \
930 LDA #A
940 CLC
950 ADC #B
960 STA ptr1

970 LDA #C
980 ADC #0
990 STA ptr2
1000 BEC
1010 LDA ptr1
1020 SBC #1
1030 STA ptr1
1040 LDA ptr2
1050 SBC #0
1060 STA ptr2
1070 LDA #keytab1 MOD &100
1080 STA keytab1
1090 LDA #keytab1 DIV &100
1100 STA keytab2
1110 \
1120 .comloop
1130 \
1140 LDY #0
1150 \
1160 .comloop1
1170 \
1180 LDA (keytab1),Y
1190 BEQ found
1200 CMP #58
1210 BEQ notcommand
1220 CMP (ptr1),Y
1230 BNE next

```



## Extra Commands listing

### From Page 39

1240 INY	1790 EQUB 0	2360 LDA vname1	2930 LDA #17
1250 JMP comploop1	1800 EQUW normal	2370 STA swap3+1	2940 JSR oswrch
1260 \	1810 EQUW "FRAME"	2380 JSR swap1	2950 LDA #7
1270 .next	1820 EQUB 0	2390 LDA #674	2960 JSR oswrch
1280 \	1830 EQUW frame	2400 STA swap2+1	2970 LDA #17
1290 JSR incmatch	1840 EQUW "SCROW"	2410 LDA vname2	2980 JSR oswrch
1300 BNE next	1850 EQUB 0	2420 STA swap3+1	2990 LDA #128
1310 JSR incmatch	1860 EQUW scron	2430 JSR swap1	3000 JSR oswrch
1320 JSR incmatch	1870 EQUW "SCROFF"	2440 RTS	3010 RTS
1330 JSR incmatch	1880 EQUB 0	2450 \	3020 \
1340 JMP comploop	1890 EQUW scroff	2460 .swap1	3030 .frame
1350 \	1900 EQUB 59	2470 \	3040 \
1360 .found	1910 \	2480 LDY #0	3050 LDA #17
1370 \	1920 .beep	2490 \	3060 JSR osbyte
1380 BTY offset	1930 \	2500 .swap2	3070 RTS
1390 INY	1940 LDA #7	2510 \	3080 \
1400 LDA (keytab1),Y	1950 JSR oswrch	2520 LDA #400,Y	3090 .acron
1410 STA acadd1	1960 RTS	2530 \	3100 \
1420 INY	1970 \	2540 .swap3	3110 LDA #3
1430 LDA (keytab1),Y	1980 .swap	2550 \	3120 LDY #0
1440 STA acadd2	1990 \	2560 STA #400,Y	3130 LDY #0
1450 LDA # (quit-1) DIV#100	2000 LDY offset	2570 CPY #3	3140 JSR osbyte
1460 PHA	2010 \	2580 BEQ swapdone	3150 RTS
1470 LDA # (quit-1) MOD#100	2020 .swap0	2590 INY	3160 \
1480 PHA	2030 \	2600 JMP swap2	3170 .scroff
1490 JMP (acadd1)	2040 LDA (ptral),Y	2610 \	3180 \
1500 \	2050 CMP #32	2620 .swapdone	3190 LDA #3
1510 .incmatch	2060 BNE first	2630 \	3200 LDY #2
1520 \	2070 INY	2640 RTS	3210 LDY #0
1530 LDA keytab1	2080 JMP swap0	2650 \	3220 JSR osbyte
1540 CLC	2090 \	2660 .zeroint	3230 RTS
1550 ADC #1	2100 .first	2670 \	3240 \
1560 STA keytab1	2110 \	2680 LDA #0	3250 .quit
1570 LDA keytab2	2120 SEC	2690 LDY #4	3260 \
1580 ADC #0	2130 SBC #64	2700 \	3270 DEC offset
1590 STA keytab2	2140 ASL A	2710 .zeroloop	3280 LDA offset
1600 LDY #0	2150 ASL A	2720 \	3290 CLC
1610 LDA (keytab1),Y	2160 STA vname1	2730 STA #400,Y	3300 ADC #A
1620 RTS	2170 INY	2740 INY	3310 STA #A
1630 \	2180 INY	2750 CPY #66C	3320 JSR checkend
1640 .keytable	2190 INY	2760 BNE zeroloop	3330 PLA
1650 \	2200 LDA (ptral),Y	2770 RTS	3340 PLA
1660 EQUW "BEEP"	2210 BEC	2780 \	3350 PLA
1670 EQUB 0	2220 SBC #64	2790 .inverse	3360 PLA
1680 EQUW beep	2230 ASL A	2800 \	3370 PLA
1690 EQUW "SWAP"	2240 ASL A	2810 LDA #17	3380 PLA
1700 EQUB 0	2250 STA vname2	2820 JSR oswrch	3390 PLA
1710 EQUW swap	2260 INY	2830 LDA #0	3400 PLA
1720 EQUW "ZEROINT"	2270 INY	2840 JSR oswrch	3410 JMP continue
1730 EQUB 0	2280 BTY offset	2850 LDA #17	3420 \
1740 EQUW zeroint	2290 LDA vname1	2860 JSR oswrch	3430 NEXT
1750 EQUW "INVERSE"	2300 STA swap2+1	2870 LDA #135	3440 DSCL1 ("SAVE ABC "+B
1760 EQUB 0	2310 LDA #674	2880 JSR oswrch	TR#start+" "+STR#PI)
1770 EQUW inverse	2320 STA swap3+1	2890 RTS	
1780 EQUW "NORMAL"	2330 JSR swap1	2900 \	
	2340 LDA vname2	2910 .normal	
	2350 STA swap2+1	2920 \	

*This listing is included in this month's cassette tape offer. See order form on Page 61.*



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# YOU MUST KNOW WHERE TO DRAW THE LINE..

IF you've followed this series so far your screen should now be aglow with all sorts of coloured messages. You'll have a mastery of the COLOUR command and be a virtual virtuoso of VDU 19.

This month will see us travelling further into the realms of graphics as we leave text behind and learn where to draw the line.

Unsurprisingly, to get the Electron to draw a line you have to tell it that you want a line drawing. You use the aptly named DRAW command, but that's not all there is to it.

If someone told you to draw a line, your first response would be "Where?" Just like you the micro needs more information, and this is supplied in the form of two numbers following DRAW, so:

**DRAW 1000,1000**

gives the micro the data it needs.

Now when we want to put text in various screen positions we use TAB followed by a couple of numbers. These are coordinates measured in lines and character spaces from the top left corner of the screen indicating where the text is to appear.

Are these the numbers that follow the DRAW command? The answer is no.

Annoyingly, although the DRAW command does use a system of coordinates to decide exactly where the line is drawn, it uses a completely different set from those used with TAB.

Having said that, the gra-

phics coordinates are quite simple to use when you get the hang of them. Figure 1 shows how they are measured.

As you can see the graphics coordinates are measured from the bottom left corner of the screen which has the value 0,0. The horizontal scale or X axis is divided into 1280 divisions, numbered from 0 to 1279.

Similarly the vertical scale or Y axis consists of 1024 parts numbered from 0 to 1023. Using these two axes you can – theoretically, at any rate – pinpoint any of 1024\*1280 points on the graphics screen in the form of X coordinate, Y coordinate.

It's these coordinates that we use with DRAW and unlike the text coordinates we use with TAB, regardless of which mode we are in the same graphics coordinates apply.

So with no more ado let's draw a line. Put the Electron into Mode 5 with:

**MODE 5**

and then draw a line with:

**DRAW 640,512**

This should produce a line going from the bottom left corner to the centre of the screen. To understand how this happens it's necessary to understand the concept of the graphics cursor.

You're already used to the text cursor – the annoying flashing line that shows where the next character is going to appear on screen. There's also a graphics cursor. However the graphics cursor is far more reticent.

In fact it's invisible. But while you may not be able to see it, to the Electron it's there and it uses the position of the graphics cursor to decide how to obey the various graphics commands such as DRAW.

Now what DRAW tells the micro is that it is to draw a straight line between the current position of the graphics cursor and the point specified by the numbers following the DRAW. This is what happened when we drew our line with:

**DRAW 640,512**

When we change mode the graphics cursor automatically

goes to the origin as 0,0 is known. So when we issued the above command the micro knew that it had to draw a line from the current cursor position 0,0 to the centre of the screen 640,512.

Can you guess what will happen if you now tell the micro to:

**DRAW 1279,1023**

The result is that line extends to the top-right corner of the screen. If you like you can think of the graphics cursor as the point of a pen. Before the last DRAW command it was resting at 640,512. Then our:

**DRAW 1279,1023**

told it to go to the point 1279,1023. This it does, with the point of the pen sketching a straight line as it does so. If you now enter:

**DRAW 1279,0**

followed by:

**DRAW 0,0**

you'll see a right angled triangle appear. Play around with DRAW, issuing your own commands such as:

**DRAW 56,89**

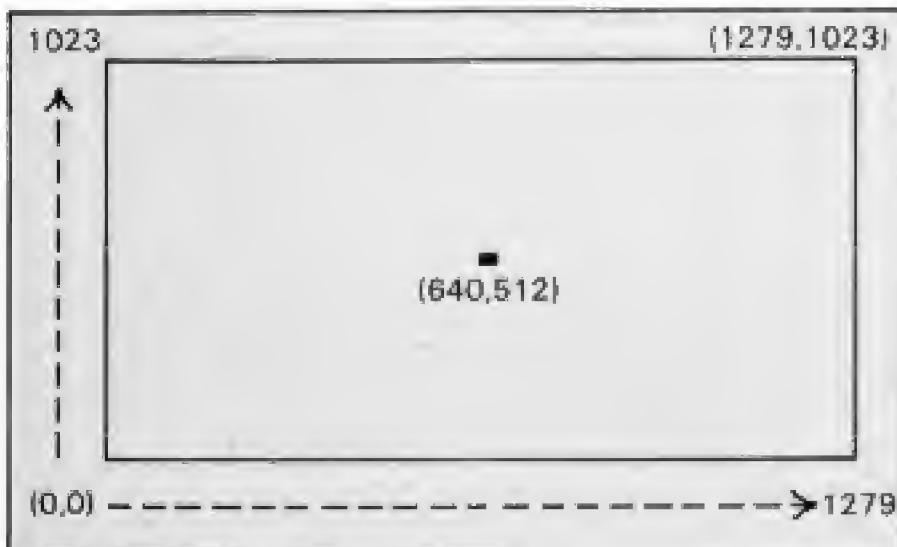


Figure 1: Graphics coordinates

**‘The graphics cursor  
is far more reticent  
– in fact it’s invisible’**



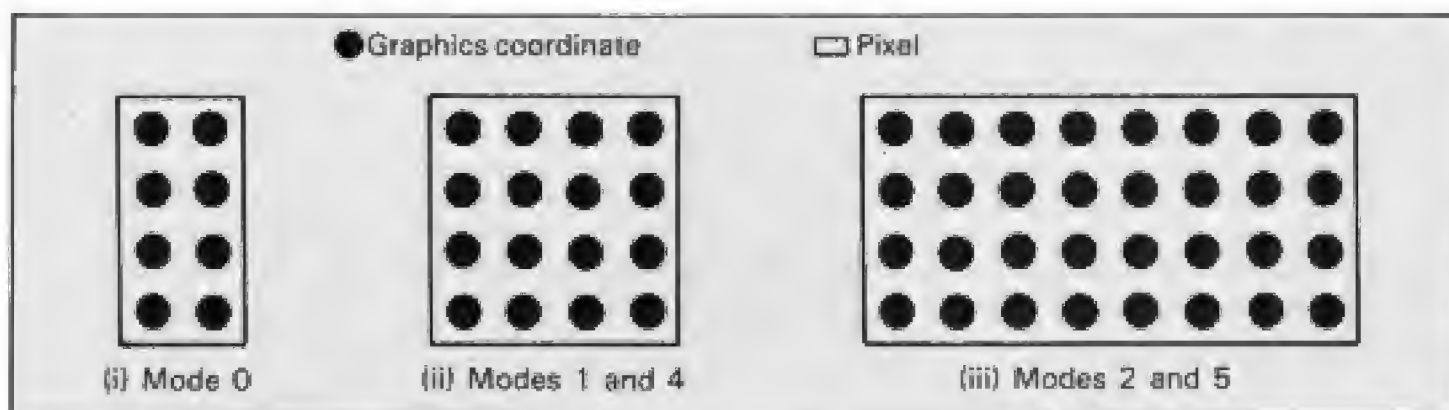


Figure 11: Modes, pixels and graphics coordinates

At first stay within the screen coordinate values shown in Figure 1. As you get more confident try exploring other values. What happens if you:

**DRAW 2000,2000**

or:

**DRAW -100,-100**

Try it and see – or rather see only part of the line that can appear on the display.

Now as you travel round the screen you'll probably notice one drawback to DRAW. You're always stuck with going from the last point mentioned in a previous DRAW command.

The only exception is after a mode change when the graphics cursor is waiting at 0,0, but this isn't always what we want.

Going back to the pen point image of the graphics cursor, when we draw on paper we often lift our pen from one part of the paper and move it to another. We don't want the trailing line that we would get from using DRAW, so is there a Basic command that will allow for this?

The answer is yes – the MOVE command. This tells the graphics cursor to move from its current position and go to the coordinates found after MOVE, and no line is to be drawn as it does this. Let's try it out. Put the Electron into Mode 0 with a quick:

**MODE 0**

which will return the graphics cursor to 0,0.

```
10 REM Program 1
20 MODE 0
30 VDU 23,1,0;0;0;0;
40 FOR line=1 TO 50
50 MOVE 640,512
60 DRAW RND(1279),RND(1023)
70 NEXT line
80 REPEAT UNTIL FALSE
```

Program 1

Suppose we now want a line to be drawn from the centre of the screen to the top left corner. Obviously we need to get the graphics cursor to the centre of the screen and start DRAWing from there. However we can't use a:

**DRAW 640,512**

to do this. This does position the graphics cursor in the centre of the screen but it leaves an unwanted line behind it as it goes.

What is needed is a MOVE command. Go back to the beginning with:

**Mode 0**

and try:

**MOVE 640,512**

and you'll see nothing. Don't despair though, the graphics cursor has moved to the centre of the screen. This is shown by the line that appears when we use:

**DRAW 0,1023**

It goes from the last cursor position – 640,512 – to the top left corner – 0,1023.

I'll leave it to you to cover

the screen with lines as you explore DRAW and MOVE. Program 1 shows both commands in use, drawing a simple star shape. Try leaving out line 50 and see what happens.

Line 30 is just there to switch off the text cursor while the last line forms an endless loop, stopping the prompt from appearing and spoiling our masterpiece.

Once you're confident you understand MOVE and DRAW – they're quite simple really – try writing a program to produce a simple picture on the screen, but before that have a look at Program 2.

It's a fairly simple program but it does make a couple of important points. The first is that DRAW doesn't work in every mode. As, at the touch of a key, the program loops through the Electron's seven modes you'll see that there are two occasions when no lines appear.

This is when the Micro is in Modes 3 and 6. In fact none of the graphics commands we'll be learning work in these two modes. They're confined solely to text and hence are known as text-only modes.

That still leaves us with five

```
10 REM Program 2
20 FOR loop=0 TO 6
30 MODE loop
40 PRINT "Mode ";loop
50 DRAW 1279,1023
60 wait=GET
70 NEXT loop
```

Program 2

modes in which to use our MOVE and DRAW commands. And in each mode the line is drawn across the screen from bottom left to top right. However you'll notice that the line varies in appearance.

In Mode 0 it's a thin, fine line. In Modes 1 and 4 it's coarser and in Modes 2 and 5 it seems to be built up of little blocks. The resolution of the screen, as this phenomenon is known, varies from mode to mode. So what's this about?

It harks back to our screen coordinates. As the graphics coordinates range from 0 to 1279 and 0 to 1023 there are some 1,310,720 – 1280\*1024 – points on the graphics screen.

The trouble is that even if the monitor or TV we use could handle that number of points our poor little Electron can't.

It has only got a limited amount of memory and can only spare so much for the screen. There's no way it could hold information on all these points.

The result is that in any mode there's a trade off between the number of lines and characters on the screen, the number of colours available and the resolution of the screen.

As you explore the modes you'll find that the more colours a mode has, the fewer characters per line and the coarser the resolution of the graphics screen.

Hence all the different modes of the Electron – each



## From Page 43

one a different compromise between colours, clarity and amount of memory used – and the differing resolutions.

Instead of using the graphics coordinates individually the Electron deals with them in bundles. If one graphics coordinate is referred to by a graphics command the Electron deals with that point and all the other points in that particular bundle as a job lot.

The smaller the bundle the higher the resolution, the bigger the bundle the coarser the resolution. These bundles are known as pixels. In theory you can address all the points defined by the graphics coordinates.

In practice the particular pixel size for a mode is the smallest unit you can deal with. Use a graphics command to refer to one point in a pixel

and all the points in that pixel are affected. Figure 11 shows the relationship between the graphics coordinates and the pixels in each mode.

This grouping of graphics coordinates into discrete bundles or pixels can be quite useful. Take a look at Program III which gradually fills the screen.

Here the FOR ... NEXT loop cycles 1024 times and each time a horizontal line is drawn across the screen from

```
10 REM Program III
20 MODE 5
30 VDU 23,1,0;0;0;0;
40 FOR loop=0 TO 1023
50 MOVE 0,loop
60 DRAW 1279,loop
70 NEXT loop
80 REPEAT UNTIL FALSE
```

Program III

left to right. It may be slow but it works. A look at Figure 11 gives a hint of a better way as shown in Program IV.

This does exactly the same job as Program III but does it much faster. The secret lies in

```
10 REM Program IV
20 MODE 5
30 VDU 23,1,0;0;0;0;
40 FOR loop=0 TO 1023
50 MOVE 0,loop
60 DRAW 1279,loop
70 NEXT loop
80 REPEAT UNTIL FALSE
```

Program IV

line 40 which now has a STEP 4 at its end. From this you'll see that the loop cycles only 256 times as opposed to the previous programs 1024 cycles. Yet the result is the

same.

The explanation lies in the pixels. In Mode 5 each pixel contains 32 graphics coordinates – 4 high by 8 across. Now when a line is drawn through any one of the four rows of graphics coordinates in one of these pixels every row in the pixel is turned on.

So it's a waste of time DRAWing a line through the other coordinates contained in that pixel as the job has already been done. Hence Program IV only has to take the Y coordinates in steps of four at a time. The result is the same.

● And that's where we'll leave it for this time. Try varying the mode and the step in Program IV. Can you get the lines going from top to bottom or left to right? That should keep you busy until next month when we'll be looking at lines again, only a little more colourfully.

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WE had a brief look at files last month and I introduced random access filing. To demonstrate how powerful this can be I've written a short database which can be used to store a list of names and telephone numbers on disc.

All disc systems for the Electron and BBC Micro are capable of random access filing so the database will run on either micro, provided it is disc-based. BBC Micros will, of course, need Basic II.

If you remember, last month we saw that to create a file we use OPENOUT and that:

```
file=OPENOUT "Data"
```

creates a file called Data. To write information to the file we use PRINT# like:

```
PRINT# file,a,b%,c$
```

This writes a real number *a*, an integer *b%* and a string *c\$* to the file. When we've finished we CLOSE the file with:

```
CLOSE# file
```

When we want to read what's in the file we use OPENIN and INPUT# like:

```
file=OPENIN "Data"
```

```
INPUT# file,a,b%,c$
```

not forgetting to close it again afterwards.

Note that the data is input

in the same order that it was written. If it isn't you'll get an error message.

When information is written to a file what actually happens? Well, first a byte is written to say what type of data follows – &40 indicates an integer, &FF means a real and &00 a string.

Integers are four bytes long, which means that a total of five bytes need to be written to the file – the type byte plus the integer. Reals are six bytes, one for the type and five for the real number.

Since strings can be any-

thing from 0 to 255 characters long an extra byte is needed to say how long it is. So a string consists of one byte for the type, one byte for the length followed by the string itself which, incidentally, is actually stored backwards.

Have a look at this month's example program, Minibase which gives you an electronic telephone directory. I'll go through the six menu options one at a time.

The first creates a new file using OPENOUT. Three strings, each 15 bytes long, are used to store the telephone number, first name and last name.

So each record in the file is

(15+2) + (15+2) + (15+2) bytes long – 15 bytes for the string, one for the type and one for the length each time. The record length is stored at the start of the file.

The pointer PTR# is set to the end of the file, the maximum number of records multiplied by the length of each record, and then closed.

The length of a file is initially zero and whenever PTR# is moved past the end of a file its length is increased, so this reserves space on the disc for our database.

Although not essential it's useful, since if there isn't enough space on the disc an error will be reported which can be trapped.

The second option opens a file. Note that OPENUP is used rather than OPENIN. This



### Minibase

#### Electron Telephone Directory

1. Create new file.
2. Open file.
3. Read record.
4. Delete record.
5. Add record.
6. Close file.

Option...

Current file: Family

### Minibase

#### Electron Telephone Directory Record No.3

Name: Roland Waddilove  
Tel. 234-234-24

Next one?



## From Page 45

opens a file for both reading and writing. If the channel number stored in *file* is zero then the file doesn't exist and an appropriate error message is given.

The length of each record is read from the start of the file. When a file is opened the function EXT# returns the length of the file. So, EXT# divided by the length of each record gives the maximum number of records, *max*.

A record is read by moving PTR# to the start of the record and inputting the first name,

last name and phone number. The first record is at 1 x record, the second 2 x record, the third at 3 x record and so on.

To delete, a record PTR# is moved to the start of the record and three null strings are written, "", "", "".

When a record is added it is always added to the first free space.

This is found by starting with record one and reading *first\$* until it's null string, "".

The new record is placed here.

The last option closes the file when you've finished with it. If you don't close it any

alterations you made may not be written.

Start by creating a file with option one. You can't do anything until you've opened the file, so select option two and open it.

If you read it you'll see that it's empty, so add a few records then close the file. The data is now safe on disc. At a later date you can open it again, add a few more records, delete some, and so on.

How many names and telephone numbers you can fit on a disc naturally depends upon the disc system. There is 320k of space available on a

Plus 3 disc and since each record only requires 51 bytes we can store 320,000/51 or 6,274 names and phone numbers, which should be enough to satisfy most people.

Minibase isn't meant to be the definite database for the Electron, it was designed simply to demonstrate random access filing. You can't sort or print records, or even catalogue the disc so it's far from complete.

Having started you off I'll leave it to you to finish it.

● Next month we'll look at extra commands for your Electron.

```

10 REM Minibase
20 REM By R.A.Waddilove
30 REM (c) Electron User
40 ON ERROR CLOSE# 0:REP
ORT:PRINT" at line ";ERR:EN
D
50 MODE 6:VDU 19,0,4,0;
60 name$=""
70 COLOUR 129:COLOUR 0:P
RINT TAB(13,1)" MiniBase "
80 COLOUR 128:COLOUR 1:P
RINT TAB(5,3)"Electron Tele
phone Directory"
90 VDU 28,4,24,36,5
100 REPEAT CLS
110 PRINT TAB(0,18)"Curre
nt file: ";name$:CHR$30
120 PRINT "1. Create new
file."
130 PRINT "2. Open file."
140 PRINT "3. Read record
."
150 PRINT "4. Delete reco
rd."
160 PRINT "5. Add record.
."
170 PRINT "6. Close file.
."
180 PRINT "Option...";
190 REPEAT key=GET-48
200 UNTIL key>0 AND key<7
210 CLS
220 IF key>2 AND name$=""
THEN RUN
230 ON key GOSUB 280,400,
490,650,790,900
240 UNTIL FALSE
250 END
260
270 REM Create file
280 PRINT""Create new fi
le..."
290 INPUT""Name ";name$
300 file=OPENOUT name$
310 INPUT""How many name
s ";max
320 record=(15+2)+(15+2)+
(15+2)
330 PRINT# file,record
340 PTR# file=record+(max
+1)
350 CLOSE# file
360 name$=""
370 RETURN
380
390 REM Open file
400 PRINT""Open file..."
410 INPUT""Name ";name$
420 file=OPENUP name$
430 IF file=0 PRINT""No
such file!";CHR$7:FOR i=0 T
O 5000:NEXT:RETURN
440 INPUT# file,record
450 max=(EXT# file DIV re
cord)-1
460 RETURN
470
480 REM Read record
490 PRINT""Read record..
."
500 PRINT""Which (1-"ma
x");
510 INPUT number
520 REPEAT CLS
530 PTR# file=number+reco
rd
540 INPUT# file,first$,la
st$,phone$
550 PRINT "Record No.";nu
mber
560 PRINT""Name: "first$
;" ";last$""Tel. ";phone$
570 PRINT""Next one?";
580 REPEAT key=GET AND &D
F
590 UNTIL key=ASC"N" OR k
ey=ASC"Y"
600 number=number+1
610 UNTIL key=ASC"N" OR n
umber>max
620 RETURN
630
640 REM Delete record
650 PRINT""Delete record.
.."
660 PRINT""Which (1-"ma
x");
670 INPUT number
680 PTR# file=number+reco
rd
690 INPUT# file,first$,la
st$,phone$
700 PRINT""Name: "first$
;" ";last$""Tel. ";phone$
710 PRINT""Delete...?";
720 key=GET AND &DF
730 IF key<>ASC"Y" RETURN
740 PTR# file=number+reco
rd
750 PRINT# file,"","",""
760 RETURN
770
780 REM Add record
790 number=0
800 REPEAT CLS
810 PRINT""Add record..."
820 REPEAT
830 number=number+1
840 PTR# file=number+reco
rd
850 INPUT# file,first$
860 UNTIL first$="" OR nu
mber>max
870 PRINT""Record No. ";
number
880 PTR# file=number+reco
rd
890 INPUT""First name ";f
irst$
900 INPUT""Last name ";la
st$
910 INPUT""Phone number";
phone$
920 PRINT# file,LEFT$(fir
st$,15),LEFT$(last$,15),LEF
T$(phone$,15)
930 PRINT""Another one?"
;
940 key=GET AND &DF
950 UNTIL key<>ASC"Y" OR
number>max
960 RETURN
970
980 REM Close file
990 IF name$<>"" PRINT""
Closing "name$:CLOSE# file
1000 name$=""
1010 RETURN

```



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## On the June 1986 tape:

**FISHING** Enjoy a quiet day by the river, and maybe catch your tea as well! **TACTICAL PURSUIT** A two player strategy game played with pawns on a chess board. **MINIBASE** Create an electronic telephone directory. **EXTRA COMMANDS** Add more commands to Basic. **SCREEN DUMP** Multi-tone screens dumps for Epson compatible printers.

## On the May 1986 tape:

**MISSILE JAMMER** Defend the city of Pezina from a missile invasion. **VECTOR LETTERS** Use \*LINE to create double height text. **DEGREES** Convert from Centigrade to Fahrenheit and vice-versa. **CROCODILE TEARS** Spell well or end up as a crocodile's dinner. **ZAP** Blast the marauding aliens. **EXTRA COMMANDS** Adding new keywords to Basic.

## On the April 1986 tape:

**INVASION FORCE** Exciting zap 'em space game. **EASTER EGG HUNT** Seasonal game using compass points. **BACK TO BASICS** Music tutor. **NOTICE BOARD** Text scrolling utility. **SEARCH** and **RECOVER** Two routines from the disc article. **NOTEBOOK** Recursion backwards.

## On the March 1986 tape:

**GRAND PRIX** Exciting race game. **DIGER** A clever test of strategy. **MARCHING ORDER** Counting and ordering numbers. **FIND AND REPLACE** Useful editing program. **SECTOR EDITOR** Excellent disc utility. **TIMEPIECE** Superb graphics demonstration. **OXO** Game of cunning. **TRICING** A circle of triangles.

## On the February 1986 tape:

**NECROMANCER** Superb text adventure. **GREBIT** Arcade action. **FAST BACKUP** Disc utility. **MACHINE CODE** How to write an arcade game. **TAPEDISC** Move software transferring techniques. **SIDEWAYS RAM** Example program.

## On the January 1986 tape:

**FRUIT WORM** An arcade classic. **HELICOPTER RESCUE** Pilot an air sea rescue helicopter. **MACHINE CODE** Detect collisions between sprites. **TAPEDISC** Transfer your software to disc. **MODE612** Multi-Mode screens.

**On the December 1985 tape:** **GET SET SANTA** Christmas fun collecting presents. **MISSILE**

**ATTACK** Save your cities! **PROGRAM PROBE** Using joysticks. **SPACE COUNT** Counting for youngsters. **CHRISTMAS CARD** Cards and cards for all. **DISC MENU** Disc Menu creator.

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**KARATE WARRIOR** Electrifying combat. **ULA** Mode 6 Mode 7! **PAINT ROLLER** Colourful arcade action. **DEFUSE** Beware the bombs. **SPRITE PRINT** Machine code graphics utility. **TRAIN** Far from stationary graphics.

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## On the August 1985 tape:

**DIGGA** Exciting arcade action beneath the earth. **DODGE THE ASTEROIDS** Fun deep in space among the asteroids. **M/CODE GRAPHICS** Sliding pins of beer! \*FX The OS explored. **MOVEIT** An intriguing sliding puzzle. **HEXGRAM** An educational game to increase your word power.

## On the July 1985 tape:

**MANIC MOLE** Machine code action at its best. **HIGHER OR LOWER** Guess the card. **TIME BOMB** Carefully collect TNT. **M/CODE GRAPHICS** Two demonstrations. **FX1/2** The OS on call. **PIRATE MATHS** Sum fun. **NOTEBOOK** Password Generator.

## On the June 1985 tape:

**QUASIMODO** Bellringing classic. **DISASSEMBLER** Machine code utility. **ACTIVITIES** Educational fun. **REFLECT** Aggressive aliens. **ENGINE** Animation. **DODGE** Race track action. **STRINGALONG** Scrolling fun. **CASTLE** Medieval graphics. **MATHS CURVE** Angles and art. **NOTEBOOK** Trees.

## On the May 1985 tape:

**SKRAMBLE!** Compulsive arcade action. **SHEEPNIM** The logic game. **TEXTWRITER** Screen utility. **LIFE** A cultured classic. **CEORIC**

Educational fun. **THREE-D** Outstanding utility. **SPOKES** Fascinating graphics. **MOONORBIT** Heavenly displays. **BLAZON** Heraldic devices. **FLOWERS** A Basic bouquet. **NOTEBOOK** Annotated animation.

## On the April 1985 tape:

**SUPER ARCHER** Target practice. **BINARY SEARCH** Search data efficiently. **JOYPLUS** Switched joystick routine. **ODD ONE OUT** Educational fun. **POLYGONS** 3D rotation. **MONEY CRAZY** Arcade action. **STARCHART** The night sky. **FORTUNE TELLER** Horoscope. **COLLISION DETECTION** Alien encounters. **HILO** Guessing game. **NOTEBOOK** Hello to assembler.

## On the March 1985 tape:

**MR. FREEZE** Ice cube arcade action. **SCREENDUMP** Two procedures for printer dumps. **FILLER** The machine code fill routine. **FRED'S WORD GAME** Educational fun. **BIG LETTERS** Large text utility. **PERCY** Beat the burning fuse. **ANIMATION** Two example programs. **PIGS** Frying bacon. **NOTEBOOK** Display formatting.

## On the February 1985 tape:

**CRAAL** The mystifying maze adventure. **BOUNCY** Addictively annoying action. **PAIRS** Can you remember the cards? **BASE 4** Binary/hexadecimal conversion utility. **CATCHER** Collect the eggs before they break. **CLOCK** Time-keeping utility. **RACER** Grand Prix action. **NOTEBOOK** Graphics windows. **TRIG** All the right angles.

## On the January 1985 tape:

**SPACE BATTLE** Destroy the deadly descending aliens! **NEW YEAR** A sound and graphics greeting. **ESCAPE FROM SCARGOV** Minefield action. **PIE CHART** Statistics made simple. **CLAYPIGEON** An Electron birdshoot. **ORGAN** Music maestro please! **NOTEBOOK** An original program. **RANDOM NUMBERS** Or not so random! **SNAKES** Reptilian arcade action. **CHEESE RACE** Beat rival mice.

## On the December 1984 tape:

**CHRISTMAS BOX** Align the presents logically. **SILLY SANTA** Sort out the muddle. **SNAP** Match the Xmas pictures. **RECOVERY** The Bad Program message tamed. **CAROL** Interrupt driven music. **AUTODATA** A program that grows and grows. **NOTEBOOK** Single string handling.

## On the November 1984 tape:

**STAR FIGHTER** Anti-alien missions. **SCROLLER** Wrap around machine code. **URBAN SPRAWL** Environmental action game. **SPELL** Alphanumeric education. **JUMPER** Level headed action. **CAESAR** Code breaking broken. **KEYBOARD** Typing game.

## On the October 1984 tape:

**BREKFREE** Classic arcade action. **ALPHASWAP** A logic game to strain your brain. **SOUND GENERATOR** Tame the Electron's sound channels. **MULTICHARACTER GENERATOR** Complex characters made simple. **RIGEL 5** Out of this world graphics. **MAYDAY** Help with your morse code. **NOTEBOOK** Palindromes and string handling.

## On the September 1984 tape:

**HAUNTED HOUSE** Arcade action in the spirit world. **SPLASH** A logic game for non-swimmers. **SHORT**

**SHOWS** How sorting algorithms work. **SHORT TIME** The time they take. **CLASSROOM INVADERS** Multicoloured characters go to school. **SAILOR** Nautical antics. **MATHS TEST** Try out your mental powers.

## On the August 1984 tape:

**SANDCASTLE** The Electron seaside outing. **KNOCKOUT** Bouncing balls batter brick walls. **PARACHUTE** Keep the skydivers dry. **LETTERS** Large letters for your screen. **SUPER-SPELL** Test your spelling. **ON YOUR BIKE** Pedal power comes to your Electron. **SCROLLER** Slided strings slide sideways.

## On the July 1984 tape:

**GOLF** A day on the links with your Electron. **SOLITAIRE** The classic solo logic game. **TALL LETTERS** Large characters made simple. **BANK ACCOUNT** Keep track of your money. **CHARTIST** 3D graphs. **FORMULAE** Areas, volumes and angles.

## On the June 1984 tape:

**MONEY MAZE** Avoid the ghosts to get the cash. **CODE BREAKER** A mastermind is needed to crack the code. **ALIEN** See little green men - the Electron way! **SETUP** Colour commands without tears. **CRYSTALS** Beautiful graphics. **LASER SHOOT OUT** An intergalactic shopping gallery. **SMILER** Have a nice day!

## On the May 1984 tape:

**RALLY DRIVER** High speed car control. **SPACE PODS** More aliens to annihilate. **CODER** Secret messages made simple. **FRUIT MACHINE** Spin the wheels to win. **CHASER** Avoid your opponent to survive. **TIC-TAC-TOE** Electron noughts and crosses. **ELECTRON DRAUGHTSMAN** Create and save Electron masterpieces.

## On the April 1984 tape:

**SPACEHIKE** A hopping arcade classic. **FRIEZE** Electron wallpaper. **PELICAN** Cross roads safely. **CHESSTIMER** Clock your moves. **ASTEROID** Space is a minefield. **LIMERICK** Automatic rhymes. **ROMAN** Numbers in the ancient way. **BUNNYBLITZ** The Easter program. **DOGDUCK** The classic logic game.

## On the March 1984 tape:

**CHICKEN** Test your nerve. **COFFEE** A tantalising word game. **PARKY'S PERIL** Parky's invisible maze. **REACTION TIMER** How fast are you? **BRAINTEASER** A puzzling program. **COUNTER** Mental arithmetic. **PAPER, SCISSORS, STONE** Out-guess your Electron. **CHARACTER GENERATOR** Create shapes.

## On the February 1984 tape:

**NUMBER BALANCE** Mental arithmetic. **CALCULATOR** Make your Electron a calculator. **DOILIES** Patterns galore. **TOWERS OF HANOI** The age old puzzle. **LUNAR LANDER** Test your skill. **POSITRON INVADERS** The old arcade favourite.

## On the introductory tape:

**ANAGRAM** Sort out the jumbled letters. **DOODLE** Multicoloured graphics. **EUROMAP** Test your geography. **KALEIDOSCOPE** Electron graphics run riot. **CAPITALS** New upper case letters. **ROCKET, WHEEL, CANDLE** Three fireworks programs. **BOMBER** Drop the bombs before you crash. **DUCK** Simple animation. **METEORS** Collisions in space.



See order form on Page 61



THE latest news is that Adventure International UK has ceased trading but US Gold has taken over its product range, so all should still be available – watch this space for further details.

Good news for BBC adventurers is that *The Micro User* has a new adventure columnist, the Mad Hatter. He is prepared to answer all questions on BBC Micro games, so in future write to him instead of me.

I am having problems deciphering Eve Thompson's address. Would you write and give me your address Eve?

Many thanks to the following people – Paul Staite for his map, and Paul James for his map and solution to *Gisburne's Castle*, Chris Bailey for a map of *Five Stones of Anadon*, Chris Ottewill for his map of *Eye of Zoltan*, Jonathan Sambrook for his map and solution to *Hampstead*, and, finally, Benedict Seddon for his map of *Citadel*.

David Sturgess asks when the next Top Ten is due. I have had a lot of demands for a Top Twenty, so next time I'll double up to a Top Twenty based on all the marks I have received since we started the scoring system.

David Stirling send in a full solution to *Sorcerer of Claymorgue Castle*. He used Ian Bevan's partial solution and went on from there to finish the game. Send an SAE if you want a copy.

Robert Henderson has sent in another interesting tip. When asked "Are you a

wizard?" in *Adventure*, try typing in "Oui".

Several readers asked in which issues the two specials on *Twin Kingdom Valley* and *Sphinx Adventure* were published – July 1985 and January 1986, respectively.

Harjinder Burrha explained how to get unlimited moves in *Countdown to Doom* – plug in the cartridge and switch on, press Escape and then type LOAD "DOOM2" and, when it has loaded, list line 205 and change it to read 205 IF FNRS(78)>0 PROCM(286).

Brett Chandler, Megan McDonald and Joanna and Nicholas Fenwick have written from New Zealand to say that the following BBC adventures will run on the Electron – *Perseus and Andromeda*, *Ten Little Indians* and

*Circus* by Digital Fantasia, and *Neanderthal Man* by Alligata.

Steve Rogers wants to know how to program the function keys to store commands to be used in adventures. The syntax for defining a function key is \*KEY [number] [string];M.

If you want to define a key so that a single keypress will allow you to open a door, type: \*KEY 1 OPEN DOOR;M. The ; character is found on the right cursor key and has to be Shifted to be used. ;M simply inserts a Return so that the command is executed.

Gary Madison has produced a superb set of maps of *Sphinx Adventure* using his university's Macintosh computer. Please let me know Gary if I can copy them for readers.

Mike Herring seems to have used the least moves so far in solving *Sphinx Adventure* –

342. Has anybody done it in less? Incidentally, I have just received a comprehensive hint sheet for *Citadel*. Don't forget that SAE if you want a copy.

Diane Hurley has only just discovered *Electron User* and asks how long this column has been running. The first column appeared in the March 1985 issue and you can get copies of all the back issues.

Finally, I have decided that because my mail-bag keeps doubling every month, I'm going to have to concentrate on text adventures. So no more questions on arcade adventures please.

This month's Hall of Fame has a solution to *Gisburne's Castle* and there are also questions raised about *Citadel*. I don't think either of these can be considered as adventures and, though I'll publish any feedback I get about them, I am not prepared to consider them otherwise.



## Adventure International on the Gold standard



### BUG HUNTERS

I have had another letter about *Castle of the Skull Lord* by Samurai Software. Kelvin Haste says that the program keeps crashing with the message No room at line 2150. I have written to them for a copy and I'll come back to you when I have it.

Steve Parkinson says that *Strange Odyssey* crashes when he twists

buckle. I'm not sure if he is wearing the belt when he does this but I'll give you more details when he lets me know.

By the way Steve, thanks for that useful *Hampstead* solution.

H. Bastien is finding quite a few bugs in *The Ferryman Awaits* from Kansas. In two locations he visits the game crashes.



## HALL OF FAME

The quality and quantity of the tips sent in by readers continues to amaze me. This month sees the start of tips for **Woodbury End**, **Spiderman**, **Wheel of Fortune** and **Gisburne's Castle**. I shall be serialising them over the coming months.

### Woodbury End – Les Shipton

Here are the meanings of the clues given when you ask for help:

- Be wise with wise eyes. Get the spectacles from the raincoat pocket so that you can make sense of the signs.
- Can can clear the view. Spill the can of petrol then light it with the matches to set fire to the hut and you will gain access to the walled courtyard.
- Early one morn the curtains were torn. Hide behind the curtains when you hear people approaching.
- Twilight hours or ditto rum. If you are in the auditorium when you hear people approaching you should hide behind the scaffolding.

### Spiderman – Robert Henderson

Go to the room with the lift, open the doors and enter the lift shaft. Go up the shaft until you are stopped and then PUSH UP. Go up and you will find yourself in the penthouse. Take the painting and remove the cover to reveal a piece of paper.

Take it and go to floor 3. CLOSE EYES and enter the ringmaster's room and then PUSH KNOB and TURN KNOB. You can now open your eyes.

Go to the office with the chemicals in and get the exotic ones. Go to the chemical laboratory and MAKE WEB. Go back to the office, get the acid and calcium, then return to the lab and mix them together.

### Wheel of Fortune – Craig Romans

Go straight from the starting location to the crossroads and then east down beggar's walk, picking up everything as you go –

the beggar will follow you.

Keep on going until you get to the location west of the vending machine, then move one location west and then back to the machine. Kick the machine and take the penny that falls out.

Go north until you meet the beggar and then turn round and follow him south. When he turns to retrace his steps follow him until you are one location north of the machine and then give him the penny.

Move south to the machine and empty the cup. Insert the penny that falls out into the machine for a box of matches. Go to one location north of the crossroads and drop the truncheon and then go west from the crossroads to the building.

Search round the building for the entrance and then unlock the door with the brass key and go in. Get the ladder and lamp and leave the key and watch where they will be safe. To leave the building type GO OUT at the door.

Go south from the crossroads to the stone obelisk and then DROP LADDER and EXTEND LADDER. Climb up the ladder to get the bucket. Now find the beggar and tell him to follow you.

Go to the well and tie the bucket to the rope. Then CLIMB INTO BUCKET and tell the beggar to lower you. Don't type anything while you are being lowered. You will eventually see an exit – use it.

### Gisburne's Castle – Paul James

You need the lamp to enter the castle. Use the poison on your arrows so that you can kill the henchmen in the castle. If you use the wooden key in the trap door rooms without having the rope you will fall and die. To prevent this use the rope before using the key. Never drop the rope as you can get trapped on a floor quite easily without it.

The wooden key is used for opening the trapdoors and the metal key is used to open the iron doors. The sack helps you to carry more, and the bottle is needed to carry the oil.

## FEEDBACK

This section is again dominated by the adventuring prowess of Geoff Larsen.

To get **Gold Baton** in the game of the same name you need to feed the slugs to the giant crab, sail across the lake in the small raft, blow the horn and then throw the knife.

To finish the game in **Hampstead** Carl Barlow should return to the Oxfam shop by car, change back into his tracksuit, pick up his bike and go into Hampstead.

For Michael Peters to be able to return to the ship in **Strange Odessey** he must make the plastic set in the wall glow one times – (sic) which is done as follows: PULL ROD, RUB PLASTIC – the plastic glow one times (sic) – which is PLASTIC – it then glows one time. Michael should now go back through the curtain of light.

Geoff has completed **Strange Odessey** and says that he doesn't think you can translate the writing on the boulder.

## SOS

To my eternal shame there are quite a lot of problems I can't answer this month – I'll get the worst over with first.

Has anyone solved **Mayday**? I just can't seem to get going in it. Jeff Fraser can't get the patch from the cargo hold and Jonathan Blair keeps running out of time.

There are requests for help with several adventures that I haven't heard of before. Luke Robertson wants to know how to get past the hound, climb the steep path and get out of the goblin graveyard in Osborne's **Silver Mountain**. He also needs help to get past the irate gamekeeper in **Ten Little Indians**.

M. Watts needs help with **Xanadu**. She can't get into the gate to the pleasure dome, despite having the credit card.

Keith Scotmorn and Matthew Sheppard are in trouble with **Boffin**. You are quite right Keith, this isn't my department. Can anyone help them get past the spider on level 2?

Russell Blake needs help with **Wizard of Akyrz**. He wants to know what to do after returning the fox to its home. It's a long time since I saw this game, but doesn't he have to make a close examination of the chicken run?

Alan Allcock has the BBC version of **Old Father Time**, a Bug-Byte game, and he can't read the Greek word on the coin. Past the boulder and

through the wooden door to the east is some writing on the wall which he also can't read, and there is an unstable beam of light here that he can't pass.

I think the writing on the wall is the password to get through the beam but is anyone certain?

Harjinder Burrha is in trouble with several games.





## From Page 49

Can anyone help with the following?

In **Gold Baton** how do you light the matches or the oiled rag and get past the black knight in the castle courtyard?

In **Time Machine** how do you get past the brontosaurus and out of the passage under the sphinx?

In **Circus** how do you get into the maintenance room?

Finally, how do you get out of the first three rooms in **Escape from Pulsar 77**?

Keith Inman and Andrew Rogers are both stuck in **Citadel**. How do you get to the star port, raise the drawbridge, get into the temple past the wolf, kill the mummies, find the green/blue key to open the door to the well wheel, get to the palace and get past the man in the witch's house?

What do the five crystals look like and if they are the Cs in the buildings how do you get to them? Has anyone got the answers?

## CONTACT CORNER

Unable to find anyone with your fascination for adventures? Write to one of the adventure fanatics below, and if you want readers to write to you just let me know.

Philip Mardlin, 10 Tavistock Street, Nelson, Lancs. BB9 9JH.

Joan Davies, 103 Keswick Road, Ridge, Lancaster LA1 3LW.

Richard Meloni, 65 Central Avenue, Hounslow, Middlesex TW3 2QW.

Michael Pemberton, 11A Trent Road, Nelson, Lancs. BB9 0NY.

Derek Willoughby, 19 Humber Close, Airedale, Castleford, W. Yorks. WF10 3DU.

Martyn Amos, 1 East Town House, Heddon-in-the-Wall, Newcastle-upon-Tyne NE15 0DR.

Graeme Moore, 28 Eamont Avenue, Crossens, Southport, Merseyside PR9 9XU.

John Tipper, 7 Main Street, Newbold Verdon, Leics. LE9 9NL.

Les Shipton, 3 Chestnut Close, Wymington, Near Rushden, Northants NN10 9LX.

Steve Parkinson wants help with **Hampstead, Stolen Lamp, Terrormolinos** and **Eye of Zoltan** - he has nearly completed the last two. Ring:

0272 686195.

Finally, someone has sent their address and telephone number, but not their name - 10 Renton Lea, Guiseley, near Leeds LS20 8LU. Tel: 0943 73954.

If you want to be mentioned in Contact Corner remember to enclose your name and address - preferably in large capital letters.

## PROBLEMS... PROBLEMS

A much reduced section this month, mainly because Hall of Fame answers most of the problems raised. Each month it seems that the same old questions get asked, so please read back issues before writing in to ask for my help.

Andrew Watt can't get started in **Strange Odyssey**. Press a button.

Alex Smyth can't find the fairground in **Woodbury End**. Go north from the village then clockwise round the trees and then

go north again.

Sue Johnstone must explore the maze to find the answer to the seeming dead end in **Greedy Dwarf**.

Mary Wilde can't find the cheese in **Philosopher's Quest**. The cheese is gorgonzola and can be found and collected if you use a gas mask.

Finally, can I remind you all to enclose an SAE when you write in with a problem. I can't guarantee you'll get an answer unless you do.



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# Databases – reference libraries of the '80s

**MANY** of the most useful pieces of computer software used in schools are not based on one particular subject.

The word processor which we looked at last month is one such program. It has no actual learning content, but its use can improve the quality of education in many areas.

This month's topic is also content free, which seems a strange term for programs that get crammed with information. I refer to what are usually called databases.

Most people, when they talk of databases, really mean a program used for gaining access to a store of information.

Ceefax and Oracle are examples. They contain vast amounts of information which you can read if you have the right hardware and software.

While such enormous stores of information are useful, and in fact more and more schools are obtaining facilities for receiving them, you can only gain the information in the form that the TV companies send it to you. Analysing the facts from these databases will mean a lot of paper work.

Many teachers regard the ability to access data from a database as a prime skill needed by all pupils. In fact it would not be too far fetched to call databases the reference libraries of the 1980s.

No doubt as we move to the 21st century and yet more facts are crammed into electronic storage, it will become essential to know how to make best use of databases.

In schools the sort of information that children use is often directly related to the locality. Pupils might survey

their local shops and keep records of the sorts of products they can buy there.

A data interrogation program allows the facts to be sorted out in different ways. For example, what can be bought at Fred's shop? Or, from which shops can I buy *Electron User*?

A criticism of education in the past has been that pupils may spend a lot of time collecting data, but very little time interpreting it.

The computer, along with the database program, can make such interpretation a far easier task.

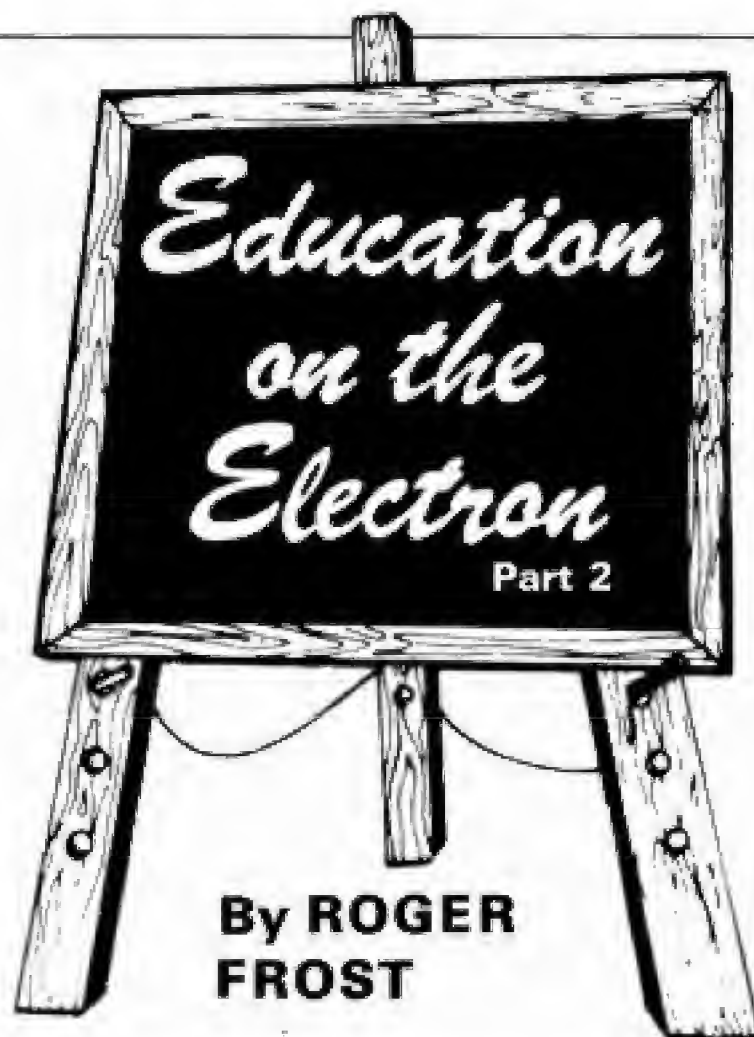
Children of all ages and abilities will find themselves using database programs in school. For some programs they will collect their own data, but for much of the time they will use information provided for them.

Entering the data in the first place is a long and tedious job which is only for the real enthusiast. No one benefits much by just copying facts from one place to another. I would not normally expect pupils to do it.

Census data is often given to children for analysis. This is of real interest to students of all ages, particularly if it relates to their own part of the country.

Of course, such a document could be equally well presented in book form as on a database, but the computer is able to display the material in different formats and makes light work of handling the information.

For instance, if pupils want to compare the life spans of coal miners and shop keepers the relevant information can be called to the screen without needing to sift through lists of



vicars and farmers as well.

Such a store of information can be used for pure fact finding, perhaps to see if anyone named Smith lived in Castle Street in the 1880s.

However it is probably of greater educational value if it motivates the children to put forward their own hypotheses and then test them out.

Some programs designed for a specific purpose actually have the data built into them. These may contain information on road traffic accidents or may have phoney police records.

Such programs are usually designed just for school use. Within a school some hundreds of pupils may each use the program for 15 minutes, and that earns its keep. This kind of situation is clearly not suited to home computer usage.

Perhaps the simplest of home uses is to produce a family database. For young children it might have just the names of relatives and their birth dates. Each month a youngster could look up who had a birthday, and on what date.

For older children the database could be extended to be a family tree. Most families have interesting characters and children enjoy finding out about them.

The next stage will involve children in creating their own base of information. The database then becomes an adjunct to another hobby. Details of a

collection could be kept, or bird watching records could be entered.

I would not expect children to spend all that long on other people's information. If they make their own they will have seen a need for it and will use it accordingly.

The point to note here is that using database programs is not an end in itself. They are used to make an entirely separate task much easier. If that is not achieved they are a waste of time.

A word of warning here for parents. If your children start to use the computer for a real purpose they are going to demand a disc system.

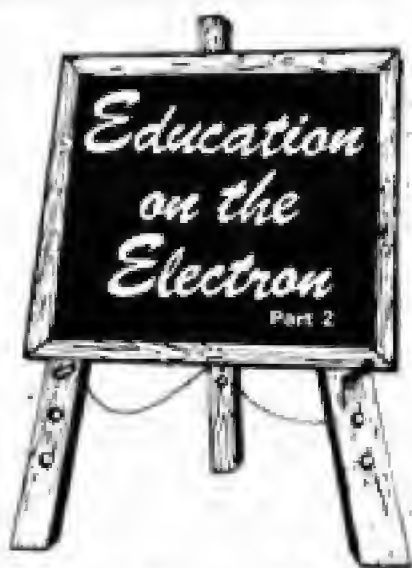
Disc systems are quicker than cassettes, and enable a much larger base of information to be stored. This is because the computer does not need to hold all of the data in its memory at once, as it can read it in from the disc as required.

To make really effective use of a database a printer is also required, so expect requests for large sums of money.

Two main types of database program are available to the home user. The first of these is the branching tree, in which an object's identity is held as a series of yes or no answers to simple questions.

The data ends up as an identification key, and could cover any area. For example, a child with an interest in





## From Page 51

farming could produce a key for farm animals.

The beauty of these programs is their simplicity. They require no thought in advance, and data can be added as a youngster thinks of it. If used properly these programs can develop a child's critical observation and logical thinking.

While branching tree programs are easy to use, no one would ever consider them as serious stores of information, as they lack the ability to sort data and find particular items.

They are, none the less, very good programs for learning about the way in which data can be stored.

Two excellent versions of this type of program are Tree of Knowledge from Acornsoft and Animal, Vegetable, Mineral from Bournesoft – both run on our faithful Electrons.

The more sophisticated type of database are known as field programs. These correspond to record cards as kept in a filing cabinet. Their great virtue is the ability to organise the filing system in any way the user chooses.

So for the earlier example of a family database the records could be sorted by name, age, phone number, or by any other piece of information that is kept.

It is this ability to do rapid searches and sorts that gives field databases their amazing power. Using this type of program does require advance

thought.

It is often very difficult to add extra information to a record. For example, if you set up a family database without space for phone numbers it may be impossible to add them later.

A good, cheap database available for the Electron is Mini Office. This has most of the features that a child would require, but falls down on its search facilities.

Only single field searches are possible, so it would be impossible to search for all those relatives who were born in June and who don't live in Birmingham. Even so, when combined with the word processor, this piece of software is almost a must for educational usage.

The database that pupils will probably use in secondary schools is called Quest. This BBC Micro software, produced by the Advisory Unit for Computer Based Education

(AUCBE) runs well on the Electron, but may produce some odd bits of Mode 7 graphics.

It allows for very complex searches, but is thus much more difficult to use and not suitable for younger users.

For Plus 3 users, Acornsoft have produced a disc database. This has many complex and sophisticated features which are ideal for older children, but is still simple to use at more elementary levels.

If you really want to store a lot of data then a ROM-based system will be needed. Such items are produced by Slogger and Acorn but, of course, come rather more expensive than cassette software.

That just about wraps up databases – a really valuable aid to effective education for children of all ages and abilities. Next month it will be the turn of the under-sevens as we consider Electrons, infants and education.

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# Micro Messages

## Now top software is flooding in

WELL, what a change! With hardly any quality software around a year ago, now it is flooding in – Exploding Fist, Beach Head and Gyroscopic to name a few.

As with many other Electron users I was cheesed off with the software and peripheral market some months back, but now the computer firms are realising the Electron's potential.

I was tempted to save up for the Plus 1 when I saw the initial range of cartridges, but now a year after its launch, there are still only nine cartridges, all by Acornsoft.

Why not include a top 20 software chart, and screen shots to show what the games look like? Keep up the good work. – **David Guyatt, Bristol.**

● You're right, there are very few ROM cartridges available for the Electron. ACP supplies blank ROM cartridges so you can make your own up from the ROMs available. Slogger produces 10 ROMs and ACP three to name just two companies, so there's no shortage.

The Plus 1 is more than just a means of plugging in ROM cartridges. It enables you to use joysticks, printers, some disc drives, sideways RAM and there's more to come.

We'll bear in mind the top 20 chart and you should find that most of the software reviews have screen shots.

### Checking with Alan

PLEASE pass on to Alan McLachlan many thanks for his very amusing and true to life section. We all have problems but only by exact checking can we ever sort them out.

If I have trouble with a listing I do one of three things – leave it if I have been on the program for a while and go back, get others to check my listing or get a hard copy and check this with the magazine.

Finally in Micro Messages for May 1986 there was a small program for switching off the Plus 1.

This could be programmed into the function keys. If this is done then there is no need to keep putting it in again and again as the function key program stays in even if Break is pressed.

Does anyone know if joysticks can be used with the Electron version of Elite and how it can be accomplished? – **J.M. Walters.**

● Elite does not work with joysticks, nor, to the best of our knowledge, is there any way of making it do so.

### Well thought of Lynx

COULD you please tell me if you have done a review of Combat Lynx?

I have been having the Electron User magazine since December 1985 and think it is a really helpful and interesting magazine.

I have Combat Lynx and would like to know what you think of it. – **Simon Hotchkiss, Shrewsbury.**

● Adam Young reviewed Combat Lynx in the August

1985 issue of Electron User.

His review ended: "Together with the very professional packaging, this all adds up to a superb game, thoroughly recommended".

### Choosing a disc drive

I WOULD like your expert advice on disc drives for the Electron. Can the Cumana disc interface connect other makes of drives like Pace or Mitsubishi as well as all the Cumana drives?

Also could you tell me if the Mitsubishi single 5 $\frac{1}{4}$  inch 40/80+ drive supplied by Watford Electronics is compatible with one of the Electron interfaces.

In all the adverts in Acorn User the makers refer to the drives as BBC drives – even the Cumana drives which are advertised in the Electron User!

I hope you can help a confused reader. – **Graeme Padgham, Tonbridge, Kent.**

● Any type of disc drive can be used with the Cumana disc interface or ACP's Plus 4 disc interface, providing it has its own power supply.

Since the majority of BBC

Micro owners with disc drives use 5 $\frac{1}{4}$ in drives it would make sense to use this format as well, then you can exchange discs with friends with BBC micros.

The drive from Watford is fine if it has its own power supply.

### Getting to the top

I READ Neil Windsor's troubled letter with interest in the April edition, and thought this might relieve his misery regarding the use of his View word processor cartridge on the Plus 1.

The advice you gave him will still cause his printer to start printing further down the page, because you omitted to mention that there is a default setting on the cartridge designed for the initialisation of book chapters.

I suggest that to print at the top of a page he should adopt the following procedure.

PE – this text command gets rid of the default setting.

TM 0

HM 0

PL – normally default 66 but a maximum of 255 may be selected.

Using PRINT is not advisable under the circumstances. Much better to type SHEETS followed by M to get rid of the default setting. Now press any key and your printer will start at the top of the page.

Congratulations on your magazine. It's far superior to anything else around, and highly readable.

I have a question you may be able to help me with. Is there an \*FX call I can use to slow down text printed on to the screen from within a program?

I have consulted the Ad-

ALL programs printed in this issue are exact reproductions of listings taken from running programs which have been thoroughly tested.

However, on the very rare occasions that mistakes may occur corrections will be published as a matter of urgency. Should you encounter error messages when you type in a program

they will almost certainly be the result of your own typing mistakes.

Unfortunately we can no longer answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the mail pages.



## From Page 53

vanced User's Guide and it would seem that the only delay setting applications available are through keyboard input. I've tried \*FX11, \*FX12, \*FX194, \*FX195, \*FX196, \*FX197 all to no avail.

Can you tell me where I am going wrong, and what I need to do? — **David Akenhead, Lewisham.**

● Slomo from Nidd Valley can be used to slow down the Electron. The problem is that everything slows down, not just printing.

## Speed gain appreciated

I HAVE just installed Slogger's Turbo-Driver in my Electron and would like to pass on to you and your readers my total support for this add-on, the best thing since the Plus 3.

The machine reacts so much faster when the Turbo is engaged, and magazine listings even those non-Mode 7 listings for the BBC Micro, truly take on arcade speed.

At £29.95 this must be the best bit of hardware around for

**WHAT would you like to see in future issues of Electron User?**

**What tips have you picked up that could help other readers?**

**Here is your opportunity to share your experiences.**

**Remember that these are the pages that you write yourselves. So**

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**The address is:**

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Electron User  
Europa House  
68 Chester Road  
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the Electron. A word of warning however, fitting is not recommended at home for those inexperienced with a soldering iron.

If only someone could now come up with the memory saving Mode 7 add-on, the Electron with its superior keyboard, disc filing system and ROM boards would leave the BBC Micro in the shade.

Thanks for an excellent magazine, I suppose with Turbo installed, I must think about taking out a subscription to your sister magazine as well. — **B. Matthews, Wrexham.**

● Slogger's Turbo-Driver is excellent and there's a full review coming up shortly. In some tests the Turbo Electron

was running 300 per cent faster.

## Converting algorithm

PLEASE could you help me with a small problem. I wish to convert the algorithm:

$$\text{address} = \text{k5000} + (\text{k10} * ?\text{k70}) + (\text{k140} * ?\text{k71})$$

into machine code, but so far the code needed takes up a whole page of memory. I would be very grateful if you could show me a shortened machine code listing of the equation. — **P. Tonkin, Dorset.**

● The equation looks like one

for calculating the screen address of a character given its x,y coordinates. This is actually an easy calculation if you go about it in the right way.

Two tables are required, one &10 times and the other &140 times. The x and y coordinates are used to index into these tables and pick out the required answer. It only takes 25 bytes of code.

```
10 REM X,Y -> Address
20 REM &70/&71 = X,Y
30 REM &72/&73 =address
40
50 FOR i=0 TO 3 STEP 3
60 P1=&900
70 [ OPT i
80 LDA &70:ASL A:TAX
90 LDA &71:ASL A:TAY
100 CLC
110 LDA table2,X
120 ADC table1,Y
130 STA &72
140 LDA table2+1,X
150 ADC table1+1,Y
160 STA &73
170 RTS
180 ]
190 table1=P1
200 FOR j=0 TO 31
210 !P1=&5000+j*&140
220 P1=P1+2
230 NEXT
240 table2=P1
250 FOR j=0 TO 19
260 !P1=j*&10
270 P1=P1+2
280 NEXT
290 NEXT
```

Store the x,y coordinates in &70 and &71 and CALL &900. The address is placed in &72 and &73, low byte, high byte.

## Plus 3 database

I RECENTLY bought a Plus 3 for my Electron and require information concerning the database disc which was supplied with the unit.

According to the booklet it is suggested that the database

## Disc drives for school use

TO add to the recent correspondence on Electron disc drives here are my experiences, both as a keen home user and as head of maths at a comprehensive school where we have raised money to buy four Electrons for the maths department.

As soon as they came out I bought a Plus 3 for my Electron at home. It has proved fast and reliable, but I knew it would not be suitable at school for pupils and teachers who are not computer experts.

For instance, if you touch Break when a program is downloaded over the disc system (necessary for most programs) what a performance to get the ADFS to operate again!

Even a changed disc requires \*MOUNT to be typed in, not to mention the con-

fusion caused by the different directories, apparent even on the Welcome disc supplied by Acorn.

Thus when enough money was raised to provide two of our Electrons with disc drives, the choice seemed to be between Solidisk and Cumana.

The Solidisk interface looked better on paper, but unfortunately the firm failed to answer my letter and it was virtually impossible to get through on the telephone to anybody who knew what they were talking about.

In despair I telephoned Cumana. Within a minute I was put on to an expert, a most favourable price was quoted, and withing four days of our cheque being sent off the interfaces and 5.25in drives arrived.

It certainly seems that the

right decision was made. With PAGE the same as with the tape system, unlike the BBC DFS, tape to disc transfer is easy, the instructions in the handbook working with all but the most protected software.

The conversion utility allows programs to be used on our Electrons as well as the computer department's BBCs.

With room for 90 files on the Cumana discs we are three times better off than the BBC DFS. Teachers and pupils have no problems — they certainly did with the tape recorders.

Disadvantages? Loading and saving is not as fast as the Plus 3 or DFS.

We have excellent computers and disc drives — all we need now is more decent educational software to run on them. — **O.F. Foreman, Tuxford Comprehensive School, Newark.**



program be transferred on to a blank formatted disc.

Please could you tell me how this program can be transferred, as after formatting all I tend to get on \*DIRCOPY facility is Bad command. — **M. Lowdon, Thornton Heath, Surrey.**

● DIRCOPY is a utility supplied in the Welcome disc. To use it place the disc in the drive and press Ctrl + A + Break. Then enter \*DIRCOPY and follow the instructions on the screen.

It's a good idea to use DIRCOPY to back up the utilities on the Welcome disc as you are stuck without them if your disc ever goes down.

## Program protection

I FREQUENTLY show my friends my programs but they always break into them.

I have used \*FX200,3 and \*FX229,1 to disable the Escape key and to wipe out a program when Break is pressed, but just before a program loads they press Ctrl + Shift then Escape and list it.

I have made a loader for the programs and disabled Ctrl but they just wipe out the line and run it so that I do not know what to do.

In programs like Terror-molinos they use \*RUN in their loader programs and you cannot break into those.

Could you advise me what to do. — **Adrian Hollis, Nottingham.**

● Program protection is quite a complex topic, and one we can't really go into here.

To prevent a program from being listed add the following lines to it:

```
9000REM Add REM's like...
9010REM *****
9020i=PAGE
9030REPEAT
9040IF ?(i+4)=&F4 ! (i+8)=&
150C
9050REPEAT
9060i=i+1
9070UNTIL ?i=&00
9080UNTIL i=TOP-2
```

Next go through your

# Egged on, marched off...

I SO much enjoyed both typing and using your program Easter Egg Chase that I am moved to congratulate both you and its author on an excellent, structured and elegant product.

It has also proved thoroughly enjoyable to my three boys aged from three to eight.

This is, sadly, in contrast to the usual offerings, such as Marching Order, which use tortuous and illogical programming to glorify the name on the title page and are obviously hurriedly cribbed from outdated BBC Micro offerings where teletext mode and a faster speed may have made them just acceptable.

Incidentally, although I enjoyed your dig at us program typists and recognised many

of my own early frustrations in your cameos, your publication is not totally innocent. Marching Order has a bug in it as printed and Fruitworm had a printing error.

Keep up the good work and please may we have more family and educational programs, especially of the quality of Easter Egg Chase. — **Ian M. Stewart, Preston.**

● We're please you liked Egg Chase. Marching Order is neither tortuous nor illogical, although we must admit the use of very short variable names and long multistatement lines do make it difficult to follow.

There is a bug which only occurs on the highest level. It can be cured by changing C%(4) to C%(10) in line 270.

The correct line is:

```
270 LDZ=1:DIM BZ(9),CZ(10)
):VDU 23,241,255,255,255,25
5,255,255,255,255,23,242,56
,56,146,124,16,40,40,40:REP
EATUNTILINKEY(-99)=0:FX20
```

Marching Order first appeared in our sister publication *Computing with the Amstrad*.

Unfortunately a quote was missed off line 360 in Fruit Worm. It should end "" and not ". The correct line is:

```
360IFBX)=P1ANDLX(7SOUND1,
2,50,6:LX=LX+1:P1=P1+50000:
0X=AX:WZ=BZ:BZ=2:AX=LX+6:CA
LLup:AZ=0X:BZ=WZ:="" ELSE=""
```

program adding lines like line 9010. It is important that they are exactly the same, with no extra spaces.

Lastly type GOTO 9000 and then save the program when it has finished its task.

This short routine alters the REM statements, preventing the program from being listed.

## Try the gorilla

COULD you please tell me if there are any good versions of the arcade game Donkey Kong for the Electron?

I already own a Donkey Kong cartridge for an Atari 2600, but I am disappointed with it. The game has only two screens which can get boring. — **S.S. Nijjar, Ilford.**

● Micro Power's Killer Gorilla is an excellent version of Donkey Kong with four screens.

## Repton boulders

I HAVE found a simple method with boulder problems in Repton — make a sketch of

your dig and place tiddly-wink counters on the sketch.

The moves can be worked out by moving the counters to various positions to solve the problem. — **Ray Lennard, Macclesfield.**

PS: Don't worry about the future format of Electron User, it is fine as it is.

● Thanks for the Repton tip, we are sure it will help many frustrated readers.

Thanks too, for the vote of confidence in the magazine.

## No easy re-start

WHEN checking a lengthy program it is often necessary to interrupt execution to verify correct operation, see how far it has got, and check the status of the variables.

This can be done after stopping the program by Escape but then there seems to be no way of re-starting execution from the point at which it stopped. (GOTO doesn't work if the program stops in the middle of a loop).

I feel sure re-starting must be possible on such a clever machine as the Electron. Even the little Aquarius I used to have understood STOP and

CONTINUE. But it certainly isn't covered in the handbook. — **C.W. Smith, Ruialip.**

● Whenever a PROC, GOSUB or FOR ... NEXT is encountered Basic stores information on a stack.

This information tells Basic where to return to when the PROC or GOSUB has been completed, or where to jump back to in the case of FOR ... NEXT.

When Escape is pressed the stack is cleared and all the information is lost. It is therefore impossible to continue if Escape is pressed during one of these routines.

## Sphinx special

I HAVE recently bought an Electron and am addicted to Sphinx Adventure. I have started to buy Electron User and imagine how I felt when I discovered that you have already done a Sphinx special and I missed it.

Can you tell me which back number to buy as I can't afford to buy them all at present. — **M. Gisborne, Portsmouth.**

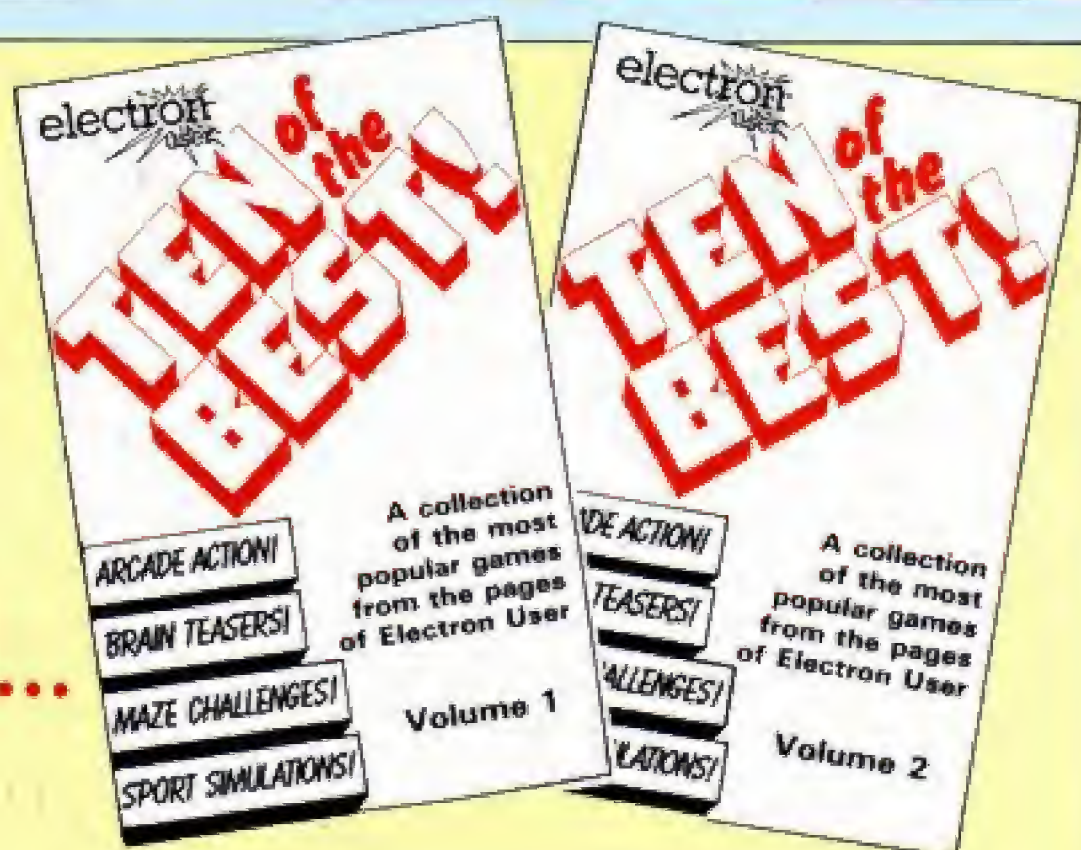
● The Sphinx special was in the January 1986 issue of Electron User.



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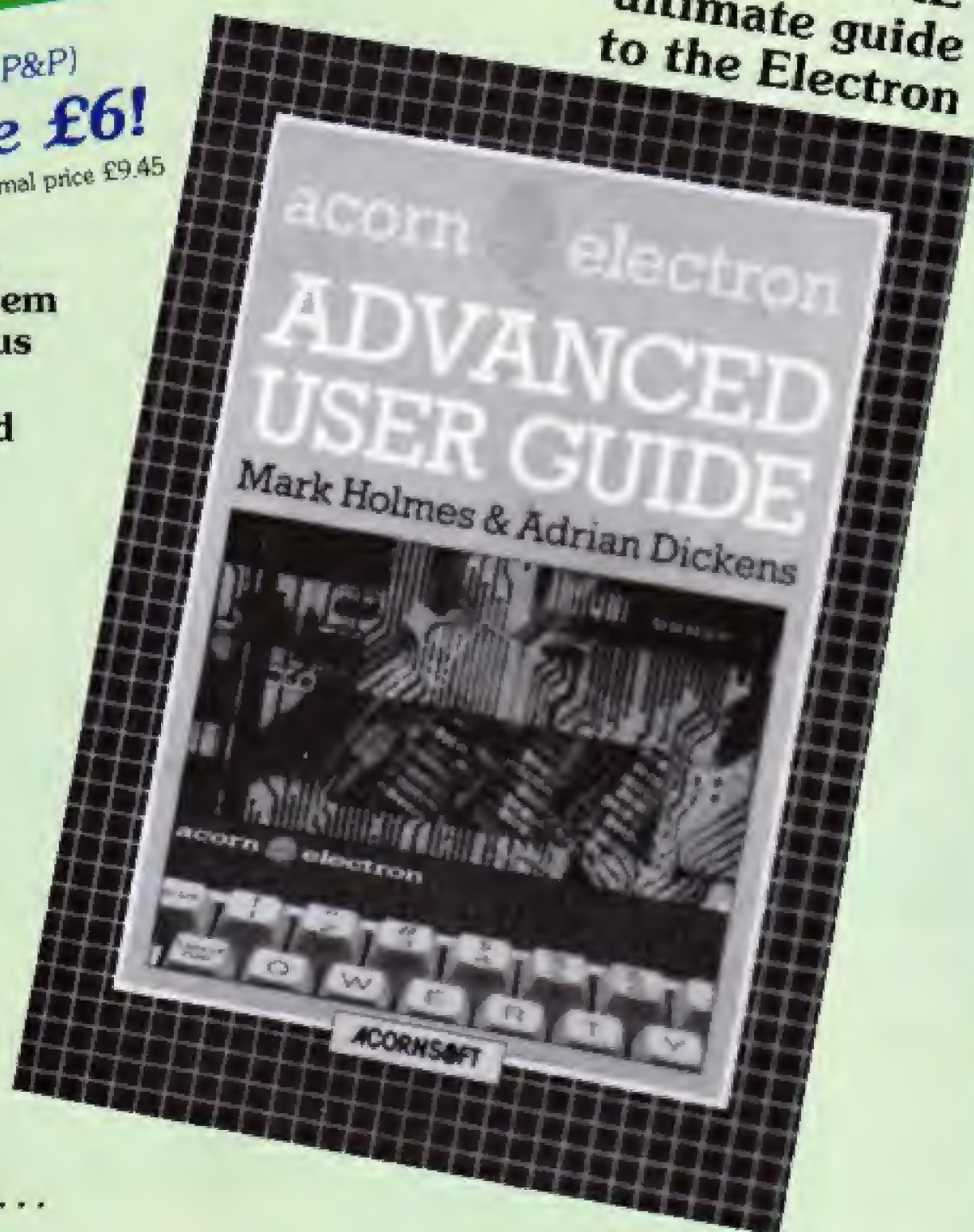
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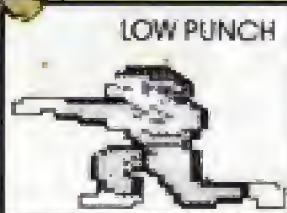
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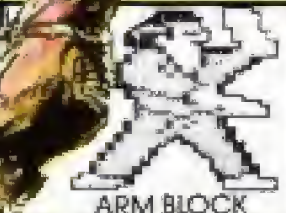
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